

Cooling Drinks For Scorching Pace-Setters



Thirty-three Norge refrigerators, installed in the pits at this year's Indianapolis Memorial Day automobile race, furnished cool drinks, sandwiches, and chocolate to drivers and pit men during the grueling 500-mile classic. Altogether, 37 Norges were in use at the event, three in the pagoda for photographers and Speedway officials, and another in the track hospital.

Price Control Pledged By N. Y. Radio Firms

(Concluded from Page 1, Column 5) Queens association's radio committee, was in charge of the discussion, in which distributor representatives told their stand on price maintenance contracts for new radio merchandise.

Dealer cooperation in ensuring that established prices are maintained was a major point stressed by all distributor representatives present. Contracts will fold up quickly without proper support, it was emphasized. Several distributors revealed that they were employing professional shoppers to check on dealer observance of the new price contracts.

Evidence that considerable business is going over to "stencil" brands, which make their greatest appeal on price, was seen by some distributor speakers as an indication that better salesmanship is needed to swing the tide back to nationally known receivers, which carry considerably higher list prices.

That fewer but better dealers might be the answer to the present price-conscious state of the retail radio field was the sentiment expressed by several distributors. Especially by distributors now using professional shoppers, indications were that price-cutting dealers would have their franchises lifted, thinning down the retailers' ranks to healthier proportions.

ASHVE Meets Monday At Hot Springs, Va.

(Concluded from Page 1, Column 2) for the morning of June 22, will hear discussions of "Cooling Requirements for Summer Comfort Air Conditioning in Toronto," by Cyril Tasker; "Seasonal Variations in Effective Temperature Requirements," by F. E. Giesecke and W. H. Badgett; "Shock Experience of 275 Workers Upon Entering and Leaving Summer Cooled and Conditioned Offices," by A. B. Newton, F. C. Houghton, Carl Gutberlet, R. W. Qualey, and M. C. W. Tomlinson; "The General Reactions of 275 Office Workers to Summer Cooling and Air Conditioning," by Messrs. Houghton, Newton, Qualey, and Edward Witkowski.

Anaconda Copper Refrigeration Tubes

Dependable!



THE AMERICAN BRASS CO.
FRENCH SMALL TUBE BRANCH
General Offices, Waterbury, Conn.

U. S. Reports On April Conditioner Orders

WASHINGTON, D. C.—Orders for air-conditioning systems and equipment booked during April by 125 manufacturers were valued at \$4,470,192, an increase of 17.9% over the \$3,790,040 booked during March, according to figures compiled by Director William L. Austin of the Bureau of the Census, Department of Commerce.

April orders, however, were about 35% down from the \$6,538,431 booked during that month last year, the report shows.

Orders for air-conditioning equipment alone totaled \$2,977,317 during April, compared with \$3,779,544 in the same month a year ago, and \$2,076,279 in March of this year.

Self-contained unit system orders rose during the month, totaling \$807,127 as compared with \$762,710 in March and \$739,433 in April, 1937. Central-station type system orders also advanced from March, totaling \$1,164,960 against \$448,653, but were down from the April, 1937, mark of \$1,234,131.

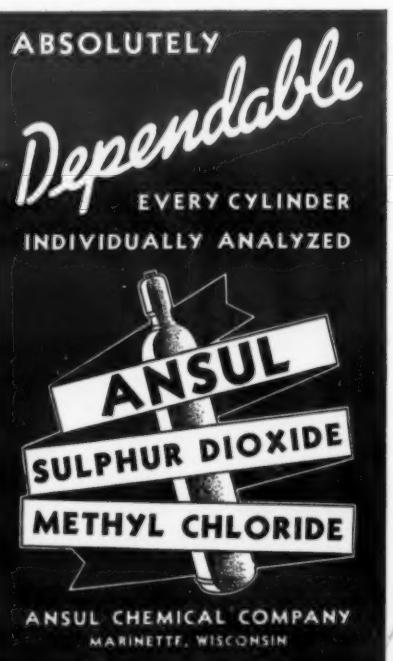
Unit systems not self-contained showed April orders totaling \$583,126, compared with \$568,645 in March, while central-station systems for industrial uses dropped to \$64,833 from a March total of \$66,930.

Orders for air washers also increased in value in April, totaling \$57,314 compared with \$42,310. Air filter orders booked during the month were \$35,388, against \$20,797 during the preceding month. Humidifier orders also rose slightly, aggregating \$59,316 compared with \$57,708 during March of this year.

Orders for the fan group totaled \$991,212, compared with \$1,090,808 in March; unit heater orders totaled \$501,663, compared with \$622,953 in the preceding month, and \$901,607 in April of last year.

Johnson Adds Kelvinator

BALTIMORE—Johnson Bros. radio and appliance store has been appointed Kelvinator dealer for the downtown area here.



G-E Pacific Men Win Cruise To Honolulu

LOS ANGELES—A pleasure cruise to Honolulu and an inspection trip through a movie studio recently were enjoyed by a group of West Coast General Electric dealers, winners in a promotion organized by Herman Rose, G-E appliance specialist.

Actors Donald Crisp and Wayne Morris joined the dealer group at luncheon in the studio before sailing on the liner Lurline, and the new General Electric building in Los Angeles was visited.

Dealers who made the trip included: Jack M. Howell, Reno; Arthur Samman, San Francisco; Mitchell T. Bowie, Seattle; Frederick Armstrong, Fresno; W. L. Schlegel, Los Angeles; John Turner, Modesto; G. E. Thomas, Modesto; John G. Palmer, Oakland; Harry C. Gerstner, San Francisco; K. R. McMahon, Los Angeles; R. M. Fry, Los Angeles.

Servel First Quarter Net Income Is \$603,184

NEW YORK CITY—Servel, Inc. reported for the quarter ended April 30 a net income of \$603,184, after depreciation, bond interest, federal income, and estimated undistributed profits taxes. This is equivalent to 33 cents a share on 1,781,426 shares of common stock after dividend requirements on the 7% preferred stock, a marked drop from the net of \$1,904,242, or \$1.06 a share on the common stock, for the corresponding quarter a year ago.

J. S. Shaw was re-elected president of the association; A. E. Allen and N. G. Symonds were named vice presidents; H. M. Moock secretary; L. B. Bourne, assistant secretary and treasurer; and J. J. Jackson, counsel.

During the World War, Mr. Kellie was a pilot in the Royal Air Force. Since that time and prior to joining American Injector Co., he has been identified with a number of companies as an engineer, in technical and sales engineering capacities.

Westinghouse Attacks Price Concessions

(Concluded from Page 1, Column 5) advertising departments of the merchandising division who had submitted winning suggestions and plans for the annual Westinghouse merchandise division marketing awards.

To encourage original thinking and study of appliance marketing problems on the part of all members of the sales and advertising departments, the company will offer these annual awards in special recognition of such study.

A special program was given to observe the golden jubilee of the Bryant Electric Co. In citing the history and progress of this organization during the past 50 years, H. E. Seim, vice president, also presented plans and promotions for the coming business year.

Following the presentations made by the merchandising division and Bryant Electric Co., the general committee on apparatus held a two-day meeting under the direction of Karr Parker, president of McCarthy Brothers & Ford, Buffalo, N. Y. Plans for the advertising and sale of lighting, rural electrification equipment, motors, controls, switches, insulating materials, etc. were submitted and considered.

During the World War, Mr. Kellie was a pilot in the Royal Air Force. Since that time and prior to joining American Injector Co., he has been identified with a number of companies as an engineer, in technical and sales engineering capacities.

Kellie Heads Sales For American Injector Co.



EDWARD KELLIE

(Concluded from Page 1, Column 8) foundry, tool room, and pattern shop, he graduated from an English college as a mechanical engineer, majoring in heating and refrigeration, and was connected with the early successful application of air conditioning to refrigerated products in India.

During the World War, Mr. Kellie was a pilot in the Royal Air Force. Since that time and prior to joining American Injector Co., he has been identified with a number of companies as an engineer, in technical and sales engineering capacities.

250 BEEVES . . . at

32°

to

36° F.

DEL MONTE
MEAT CO., INC.
WHOLESALE BUTCHERS JOBBERS
SAUSAGE MANUFACTURERS
SAN FRANCISCO

April 8th 1938.

Automatic Products Company,
2450 North 32nd Street,
Milwaukee, Wis.

Gentlemen:
We are very pleased indeed to advise that the
A/P Controls on our new Refrigerator are entirely satis-
factory, and we would take pleasure in recommending your
products to any interested parties.
With kind regards we remain,
Very truly yours,
Del Monte Meat Co. Inc.,
Frank DeBenedetti Secy-Treas.

FDB/WM.

Installation . . .

Refrigeration Unit . . .

Mills Company

Oris Olsen Refrigerator Co.
San Francisco, Calif.

VALVES 6 No. 210 A-P Thermostatic
Expansion Valves

Purchased through . . .
California Refrigerator Co.
San Francisco, Calif.

For human comfort or food preservation — wherever exacting refrigeration control is demanded — there is the place for an A-P Thermostatic Expansion Valve.

Refrigeration Engineers are invited to see an A-P Thermostatic Expansion Valve or Solenoid in use — anywhere, — on any size installation. Judge all A-P Valve Service on the satisfaction of any ONE, if you wish. It's complete Dependability on every installation, without exceptions, that has built the A-P reputation.

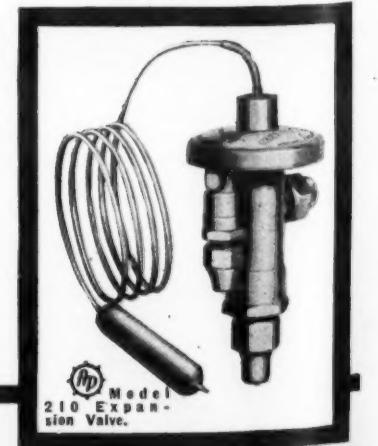
Next time, use an A-P Valve if you would enjoy freedom from valve-trouble — and your customer's satisfaction.

• AUTOMATIC PRODUCTS COMPANY
2450 NORTH THIRTY-SECOND STREET
MILWAUKEE, WISCONSIN

Export Department, 100 Varick Street, New York City

DEPENDABLE

THE BYWORD FOR A-P VALVES



Air Conditioning & Refrigeration News

The Newspaper of the Industry

Trade Mark Registered U. S. Patent Office. Established 1926 as Electric Refrigeration News
Member Audit Bureau of Circulations. Member Associated Business Papers.

Written to Be Read on Arrival

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DETROIT, MICHIGAN, JUNE 22, 1938

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TWENTY CENTS PER COPY

THE COLD CANVASS

By B. T. Umor

The Sports Page

Powel Crosley's 22-year-old pitcher, Johnny Vander Meer, gladdened the hearts of Crosley dealers everywhere last week by pitching two no-hit, no-run games in succession. This is undoubtedly the most amazing pitching feat in the history of organized baseball.

Johnny's name, we are proud to report, has appeared in this column twice previously. At the beginning of the season we designated him as one of the two best young pitchers in the National League. And a few weeks ago we noted having seen him pitch Cincinnati to a 2 to 1 victory over St. Louis in 10 innings.

Young Vander Meer can cool off the hottest batters in the league, and can put any game on ice when he steps on the mound. He is no loud-speaker himself, but his prowess is now being broadcast daily over nation-wide hook-ups. (Crosley also makes washing machines, but we couldn't get them in here—unless it's to hope that, unlike Dizzy Dean and Schoolboy Rowe, Johnny doesn't become all washed up before his normal time.)

When Max Schmeling began training for his forthcoming return bout with Joe Louis up near Schenectady, he might have known that those redoubtable General Electric engineers wouldn't be able to leave him alone.

A few days ago three of them walked into his camp with an electrical contraption. It was a device to record the speed of a fist traveling to a chin. They wanted to know how fast Der Max was.

"Oh, no," grunted the cautious German. "That information might get over to Louis."

Somehow, this department doubts that Louis would know what to do with it if he did find out.

The engineers measured one of Schmeling's sparring partners, and learned that his right moved at 50.2 miles per hour. The best a spectator could do was 20 miles an hour. Louis, we'd guess, ought to turn up at least 100 mph. with that snake-tongued left.

Big Game Fisherman

A note to this corner from Frank E. Hansen, general manager of F. C. Lovelock Pty., Ltd., manufacturers' representative in Sydney, Australia, tells of the latest recruit to the ranks of big game fishermen—Eric Ebeling, recently appointed sales engineer for the company.

On a fishing expedition on April 16, Mr. Ebeling landed a hammerhead shark, 10 feet, 7 inches long and weighing 300 pounds. After winning a battle with a "problem" that size, wrestling with run-of-the-mine technical matters ought to be duck soup (or should we say clam chowder) for Mr. Ebeling.

Congratulations, Mr. Ebeling! Why don't you come over to Detroit for a fish dinner? You bring the fish.

'Air-Conditioned Pill'

Wandering idly over the radio dial the other night, we chanced to come onto Amos 'n' Andy, right at the tragic death of Brother Kingfish's scheme to make a fortune out of a new kind of air conditioning.

For a paltry 50 cents, Kingfish had agreed to let his two brother members in the "Mystic Knights of the Sea" in on his new company, which plans to sell the "Air-Conditioned Pill." These pills, made up of purified, dehumidified, and solidified sawdust-coated ammonia, were

(Concluded on Page 20, Column 2)

International Body Will Study Food Refrigeration

LONDON, England—Technology of the refrigerated treatment of perishable foodstuffs, embracing gas storage, vitamin content, biology as relating to public health, and related subjects, will be discussed at a conference of the international commissions of the International Institute of Refrigeration, to be held here July 11 and 12.

Also discussed will be the international unit of refrigeration production, and the international method of defining the efficiency of refrigerating machines.

Program of the conference on refrigeration, to be held July 12 in conjunction with the institute meetings under the auspices of the British Association of Refrigeration, has been announced as follows:

Dr. Rudolph Plank, director of the Kalttechnisches Institut, Technische Hochschule, Karlsruhe, Germany, and W. R. Sinclair will discuss "The Ideal Comparison Cycle of Refrigeration for International Use."

Discussion on "Influence of Low Temperatures on Enzymes and Vitamins" will be presented by Dr. L. Harris; Dr. A. K. Balls of the U. S. Department of Agriculture; Dr. D. K. Tressler, chief in research for Birds-eye Frosted Foods Corp.; Dr. Katherine Howard; and Miss M. Oliver.

Dr. Franklin Kidd and Dr. T. Moran will discuss "Atmospheric Control in the Preservation of Food-stuffs," and Edgar A. Griffiths will

(Concluded on Page 20, Column 2)

3 Air Conditioners In 1938 Sears Line

CHICAGO—Sears, Roebuck & Co. is making a bid for room-cooler sales in certain metropolitan markets during the present season, with a line of three water-cooled units, housed in walnut wood cabinets.

Manufactured by the Simplex Machine Co. of Indianapolis, Ind., the Sears unit features a patented

(Concluded on Page 2, Column 5)

Macy Aided By Reversal Of Decision In Test Case

NEW YORK CITY—Reversing a decision by New York Supreme Court Justice Louis A. Valente, the appellate division of the state supreme court has made a ruling permitting R. H. Macy & Co., department store, to reinstate three defenses in its test case with Clarence H. Schimpf, Flushing, Long Island, dealer.

Mr. Schimpf has charged Macy's with violating a price-fixing agreement.

(Concluded on Page 2, Column 5)

California Dealer Designs Best Electric Range Window Display

NEW YORK CITY—Winners in the \$1,200 national electric range window display contest sponsored by the Modern Kitchen Bureau and participated in by dealers, department stores, and utilities, have been announced by H. L. Martin, bureau manager.

Henry Levy Co., Santa Barbara, Calif., won the first prize of \$150 in the dealer group.

H. L. Stiff Furniture Co., Salem, Ore., won the first prize of \$150 in the department store group.

Puget Sound Power & Light Co., Lake City office, Seattle, Wash., won the first prize of \$150 in the utility group.

Runners-up and awards in the dealer group were: second, George E. Burkholder, Napoleon, Ohio, \$100; third, Childs & Anderson, Granite City, Ill., \$50.

(Concluded on Page 2, Column 4)

Sales Crusade Gets Started In 19 More Cities

Business Leaders Hear Kelvinator Executives Explain Promotion

DETROIT, June 21—Salesmen representing all lines of business in 19 more cities across the country became partners today in the National Salesmen's Crusade, the campaign started by Nash-Kelvinator Corp. in the belief that by arousing dormant buying desires, the salesmen of this country can start merchandise moving, relieve unemployment, and return prosperity.

From the central meeting in the grand ballroom of Chicago's Stevens hotel, a telephone hook-up carried the proceedings to 18 similar gatherings in other cities, and Columbia Broadcasting System brought the crusade to 110 more towns on a nation-wide chain.

Detroit's meeting, attended by

SpeECHES made at last week's meeting in New York City inaugurating the National Salesmen's Crusade are published on pages 4 and 5 of this issue.

more than 800 executives and salesmen, was held in the Masonic Temple. Harvey Campbell, executive vice president of the Detroit Board of Commerce, chairmanned the event.

In opening the local meeting, Mr. Campbell emphasized the importance of keeping salesmen from becoming economists, of which, he said, there are too many already. "Many of the young men who are now in business never knew what some of we old-timers call prosperity," he said. "Yet they're doing all right."

Too many salesmen quit trying, because somebody has told them that business is bad, Mr. Campbell continued. Return of prosperity, he said, depends on two things:

1. Get government back into the hands of those who have been elected to run it.

2. Start selling again. "The wheels of industry hum in tune with the salesman's order book," Mr. Campbell declared.

Raymond J. Kelly, corporation counsel, welcomed the Michigan crusaders on behalf of the city of Detroit.

George H. Davis, president of the U. S. Chamber of Commerce and chairman of the Chicago meeting, emphasized in opening the event that hard work will supply the cure for the current depression, just as it has supplied the cure for other business slumps in the past.

(Concluded on Page 20, Column 1)

Appliance Problems To Have Spotlight At NRDGA Session

CINCINNATI—Problems concerned with the merchandising of major electrical appliances will come in for more than their normal share of attention during the mid-year meeting of National Retail Dry Goods Association, to be held in the Hotel Netherland Plaza here June 27 to July 1.

Discussions of current merchandising problems scheduled during the five-day meeting will range all the way from the question of whether or not the electrical appliance industry

(Concluded on Page 2, Column 1)

Brooklyn Dept. Store Uses Blue Book Plan

BROOKLYN—A refrigerator trade-in policy based on "blue book" appraisals for various models and makes was announced last week by Abraham & Straus, local department store, in a six-column advertisement in metropolitan papers.

This is believed to be the first time that a department store has attempted to handle its trade-ins on this basis.

"We are taking this step," the advertisement explains, "as an experiment for a period of 30 days. At the end of that time we hope to announce that it will be a permanent policy."

"A. & S." the advertisement con-

(Concluded on Page 20, Column 4)

New Jersey Law Bans 'Less Than Cost' Sales

TRENTON, N. J.—Price cutting on electrical appliances sold at retail will be curbed in New Jersey under a new statute banning advertisement, sale or offering for sale of merchandise at less than cost. The new "fair sales" measure became law when repassed by the state legislature here June 16 over Gov. Moore's veto.

Retailers are prohibited by the new law from selling at less than cost, and wholesalers at less than cost plus a 2% delivery charge. Violations are punishable by a fine of \$50 collectible by district court actions. Exceptions to the bill's major prohibitions include bona fide clearance sales, marked and advertised as such; disposal of imperfect or damaged merchandise, so advertised; sales upon final liquidation of a business, and sales under court direction.

Proponents believe the new law will strengthen fair trade aims in the state, since it will curb price cutting on products of wholesalers who have not issued price contracts.

(Concluded on Page 2, Column 2)

ASRE Session Shows Progress Of Engineering

Lively Discussions Follow Presentation Of Papers At 25th Conference

By Phil B. Redeker

STATE COLLEGE, Pa., June 21—(Special Wire to AIR CONDITIONING & REFRIGERATION NEWS)—Recession or no recession, budgets are not being curtailed for research and development engineering, it was revealed at the twenty-fifth summer conference of the American Society of Refrigerating Engineers which was held here today and yesterday. More than 150 members registered.

Unusually significant were the discussions which followed the reading of each technical paper presented before the society. Time after time, individuals would rise from the audience to challenge points made by the speaker and to offer conclusions drawn from research done by his company or in his laboratory.

Technological advances, it was indicated, have been pushed rapidly during the last several months.

New methods and cheaper ways of doing old things seem to be the order of the day in refrigerating engineering currently, judging from the remarks of the various speakers.

First technical session was opened with a paper by W. L. Knaus, General Electric Co., Fort Wayne, Ind., on "Properties Desired for an Ideal Refrigerant." He pointed out that the step needed in the development of the perfect refrigerant is to find a gas that has low molecular weight, to allow maximum cylinder capacity with unchanged pressures and free-

(Concluded on Page 2, Column 2)

50 N. Y. Philco Dealers To Sell York Units

PHILADELPHIA—About 50 dealers of Philco Radio & Television Corp. in the metropolitan New York area will handle the York Cool-Wave air-conditioning unit which is to be merchandised by the Philco organization, according to information released here last week.

The a.c.-d.c. model will retail in New York City, it is said, at \$425 delivered and installed, while the d.c. unit will sell for \$450 under the same conditions.

The conditioner is claimed to be capable of cooling a 20 x 20-foot room, circulating air at the rate of 310 c.f.m. and introducing fresh air into the room at the rate of 60 c.f.m.

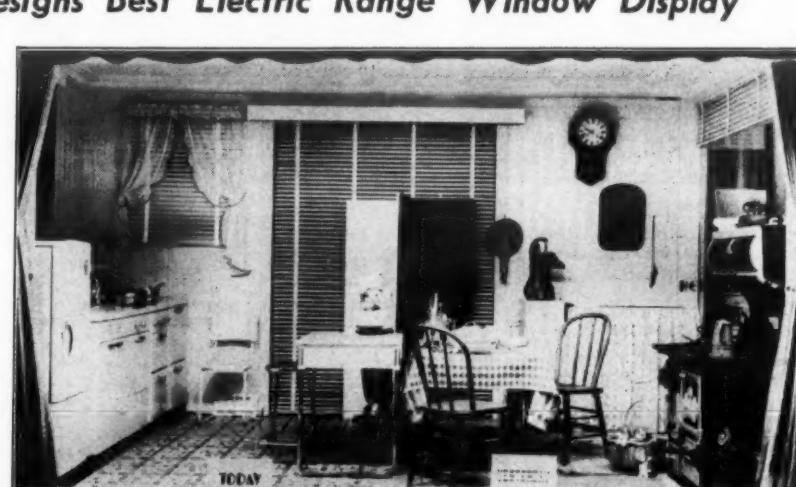
Needing only a plug-in connection and a simple window fitting for installation, the unit is readily portable. It is housed in a walnut-finished steel cabinet measuring 39 1/4 inches long, 15 1/2 inches wide, and 41 1/2 inches high.

Sparton Distributors View 29 Models In '39 Line Of Radios At Showing

JACKSON, Mich.—Sparks-Withington Co.'s 1939 line of Sparton radios, consisting of 29 models ranging in price for \$12.95 to \$250, were introduced to distributors and sales executives at the Hayes hotel here recently by Harry G. Sparks, vice president and general manager, and Harley Wall, radio sales manager.

Outstanding feature of the new Sparton radio is an improved type of "Selectronne" push-button tuning on all models from \$19.95 up.

Mr. Wall outlined the merchandising and advertising plans drafted for promotion of the 1939 line.



This attention-compelling window display, graphically contrasting the bright all-electric kitchen of today with the dingy kitchen of a few years ago, won first prize of \$150 for the Henry Levy Co., Santa Barbara, Calif., in the dealer group of the contest sponsored by Modern Kitchen Bureau.

NRDGA Will Study Appliance Sales

(Concluded from Page 1, Column 4) needs a dictator to a consideration of trade abuses in present-day appliance selling, and suggestions for their correction.

The question, "Does the Electrical Appliance Industry Need a Dictator?" will come up for discussion at the first general session of the convention, scheduled for 8 p.m. June 28 in the hotel's Hall of Mirrors.

RETAIL TRAINING

At the same meeting, Bishop Brown, director of the research bureau for retail training, University of Pittsburgh, will talk on "Training the Retailer of Tomorrow"; Dr. Faith M. Williams, of the bureau of labor statistics of the U. S. Department of Labor, will discuss "Progress on Consumer Purchase Study"; and Lew Hahn, N.R.D.G.A. general manager, will tell of "The Effect of Organized Community Cooperation."

Most thorough discussion of current appliance merchandising faults will take place during the meeting of the merchandising division on the morning of June 29. Herbert O. Hope, of the H. & S. Pogue Co., Cincinnati, will chairman the session, at which open discussion will cover consideration of the following trade abuses and their correction:

TRADE ABUSES

1. Advertising last year's models. Cut-price advertising on last year's models under impression that it is the current model.

2. Advertising price on the smaller model, but featuring a larger model.

3. Lack of standards for descriptive terms used in advertising.

4. Premium type of advertising—obsolete list prices quoted in comparative price advertisements.

5. Advertising shelf space instead of cubic foot content of refrigerators; sheet capacity for washing machines, etc.

6. Clarification of warranties—not a complete over-all guarantee; and guarantee should be in sticker form.

7. Bonuses that lead to high-pressure salesmanship.

8. Discounts to special customers for quantity purchases, etc.

9. Discount given to manufacturers' employees who buy for all their friends.

10. Lack of standard charges for servicing.

11. Inconsistent credit practices—too long terms, no down payment, acceptance of trade-ins, etc.

12. Trade-in problems—fixed or appraisal valuations? Should there be a code for trade-ins?

Other Prize Winning Window Displays



The pictures in the upper row show the double window used by H. L. Stiff Furniture Store, Salem, Ore., and which was awarded first prize in the department store group. Lower left shows the first prize utility window of Puget Sound Power & Light Co., Lake City office, Seattle, and lower right is the second prize window of the Philadelphia Electric Co. These displays were part of the electric range campaign of Modern Kitchen Bureau.

Advance In Research Shown At ASRE Meeting

(Concluded from Page 1, Column 5)

dom from toxic hazards. There is difficulty in developing a refrigerant with low molecular weight that is satisfactorily non-toxic, the speaker said.

One of the first studies of copper plating in compressors ever to be made public was presented by E. W. McGovern, E. I. du Pont de Nemours & Co., Inc., Wilmington, Dela.

According to the speaker, copper plating is in no way caused by the refrigerant gas in any of its phases. Exhaustive tests have indicated that oils, particularly low refined oils, will dissolve copper and carry copper organic compounds.

However, the speaker pointed out that oils do not precipitate the copper deposition on steel and cast iron compressor parts without the presence of some other factors, such as moisture and high temperatures.

Oils subject to oxidation are the ones most likely to cause copper plating, said Mr. McGovern.

In the other paper at the first session, G. L. Simpson, vice president, Pittsburgh Lectrodryer Corp., described the operation and uses of chemical dryers used in absorption dehumidification work.

At today's session, George Bright, Detroit consulting engineer, described modern refrigeration practice in breweries, pointing out that new practice calls for a number of compact, high-speed compressors instead of one or a few of the big old machines used in past years, and that shell-and-tube condensers of modern design are also finding a place.

Furthermore, the old crude iron pipe cores are being replaced by extended surface evaporators. Blower units, however, are not generally used because of their possible effect on open-vat processes, Mr. Bright said.

Dr. Harvey Rentschler, Westinghouse Electric & Mfg. Co., co-developer of the Sterilamp, in discussing the Sterilamp, made the significant point that only one tenth as much radiation of the ultra-violet rays is needed to kill bacteria in motion in the air than is needed to kill bacteria which have settled on something. This air circulation is a factor if Sterilamps are to be used in refrigerators, he said.

Dr. Rentschler also conducted an experiment before the audience which demonstrated that it is the radiation, and not the ozone which is caused by the rays, which results in the bactericidal action.

He furthermore claimed that the amount of ozone created would not be harmful to food tissues.

Control the Cold with this liquid cooler

Responds in a MINUTE to the beverage temperature you want. Refrigerant contacts the coils DIRECTLY giving the fastest method of cooling with the least possible temperature lag. Simple to install, easy to service—NO MOVING PARTS—low operating cost. See your jobber or write us for literature.

Superior Fittings

...designed especially for the unusual service required in Refrigeration and Air Conditioning installations. Made from hot forged brass to assure uniform density, maximum strength, and resistance to the corrosive action of refrigerant and moisture combinations.

SUPERIOR Fittings are good looking, too, combining attractiveness with dependability into the installation in which they are a part.

Carefully designed, accurately machined, and rigidly inspected...

*Superior by Name
Superior in Quality*

SUPERIOR VALVE & FITTINGS COMPANY
500 THIRTY-SEVENTH STREET • PITTSBURGH, PA.

Macy's Gains Points In Fair Trade Case

(Concluded from Page 1, Column 2) ment on Philco radios by granting excessive trade-in allowances. He specifically accused the department store of allowing more than the original purchase price on one particular trade-in.

The suit is regarded as a test case of the Feld-Crawford fair trade act. Justice Valente had stricken out the defenses involved on the grounds that they were repetitious, redundant, and prejudicial to a fair trial of the underlying issues.

The appellate division in reinstating the defenses, held specifically it was not passing on their merits, which will be tested along with other defenses when the case is called for trial next fall.

The three Macy defenses reinstated are to the effect that: (1) the term "reasonable" applied to trade-in regulations is too inexact; (2) it would be unconstitutional to permit price fixing in indefinite terms and make violations punishable with jail sentences for contempt of court; and (3) competitors were, and are, flouting fixed prices, and the manufacturer has taken no action even though notified of the conditions by the Macy company.

The latter also maintained that Mr. Schimpf in his suit is attempting to compel Macy's alone to observe fixed prices in order that business may be diverted to competitors. Macy's claimed that, insofar as the fair trade act permits such a situation to exist, it condones unjust discrimination and is, therefore, unconstitutional.

Sears Announces Line Of Room Coolers

(Concluded from Page 1, Column 2) fanned coil, having 10 fins to the inch, instead of the conventional six fins.

It is claimed by the company that air coming from the Sears room cooler has an average temperature of 51°, while a similar unit equipped with a coil having six fins to the inch will give an outlet temperature of 60 1/2°.

All units are equipped with an ionizer, and an extra air filter is supplied with each machine sold.

Prices quoted do not include installation and are for a.c. current.

Specifications and prices on the units, f.o.b. Detroit, follow below:

Size of Machine	Capacity Claimed	Air Delivery	Price
1/2-hp. 2-cylinder compressor	5,980 B.t.u. net	350 C.f.m.	\$225.00
3/4-hp. 4-cylinder compressor	9,100 B.t.u. net	350 C.f.m.	325.00
1-hp. 4-cylinder compressor	12,356 B.t.u. net	340 C.f.m.	375.00

There's Big Pay in ELECTRIC REFRIGERATION and AIR CONDITIONING If You Have the Proper TRAINING

Air Conditioning and Electric Refrigeration—new giants among industries—offer rich rewards to men of courage and ability. The greatest need of the Industry today is men who have the basic training which enables them to keep pace with rapid progress and changes in the business. Practical experience, while valuable, is not enough.

Thorough training in the fundamental theories and practices of Air Conditioning and Electric Refrigeration is required to meet the new problems constantly facing engineers, installation and maintenance men. That's why big paying jobs are going begging for lack of men with the training and knowledge needed to hold them down!

U.E.I. Offers You Complete Training

Since 1872 the founders of Utilities Engineering Institute have supplied Industry with TRAINED MEN. U.E.I. trained men occupy key positions with leading manufacturers, distributors and service organizations in every part of the United States and many foreign countries. The same practical, low-cost training that enabled these men to reach better jobs, paying more money, is available to YOU.

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Utilities Engineering Institute training is equivalent to years of practical experience. It is based upon the practical Air Conditioning and Electric Refrigeration experience of thousands of men. It is ideal training for the man now in the field. By devoting a little spare time daily to home study you may acquire a comprehensive knowledge of all branches of Air Conditioning and Electric Refrigeration.

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Engineering, Designing, Estimating, Installation Work, Servicing and Maintenance. If you wish, you may complete your training course with 2 weeks' practical work in our laboratory. When you have finished you will possess a complete, workable knowledge of Air Conditioning and Electric Refrigeration. You will be equipped for steady progress toward a better job and larger pay. Mail the coupon below for full information regarding the benefits U.E.I. Training can bring You!

Book gives information vital to every man interested in Air Conditioning and Electric Refrigeration. Sent free upon request, no obligation.



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Gentlemen:

Please send me your Free Book containing valuable information for men in Air Conditioning and Electric Refrigeration.

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Address.....

City State

COLTROL D-X

Commercial Coil & Refrigeration Co.
457 N. Artesian Ave.,
Chicago, Ill.

Established 1927
400-410 N. Wells St., Chicago, Ill.

TULSA manager of Natkin ferred to the West firm. The large home air- general m

Park R Moves

BALTIMORE operating a major app business, North Ave

Southern

Little Furniture local dealer refrigerators. He Fairbanks-M is sales m appliance d

Abraham Bran

JAMAICA branch store in the demonstration lectures has Abraham & Bran

Distributor-Dealer Doings

Clark Heads Cooling For Auto Equipment

DENVER—Harold H. H. Clark has been appointed manager of the heating and air-conditioning department of Auto Equipment Co., wholesale automotive, electrical, and radio firm here.

Before joining Auto Equipment Co., Mr. Clark had been manager of the heating division of the Norge distributor in Salt Lake City, and had been resident field engineer for Simplex Oil Burning Co., New York City.

A graduate of West Point, Mr. Clark served in the army aviation section of signal corps from 1916 to 1919. Later, at Chicago Institute of Technology, he specialized in heating and air conditioning.

Indiana Service Co. Wins Electric Range Award

ATLANTIC CITY, N. J.—Indiana General Service Co., Muncie, Ind., was presented with the Hughes Award for promotion of electric cookery during 1938 at the recent annual Edison Electric Institute convention here.

George Hughes, president of Edison General Electric Appliance Co. and inventor of one of the first practical household electric ranges, presented the award to Arnold Hogan, assistant general manager, and E. J. Kirkpatrick, manager of residential sales of Indiana General Service Co.

The award consisted of a silver trophy and a check for \$1,000.

Hughes Heating Equips Radio Lab At Wright Field

DAYTON, Ohio—Hughes Heating & Air Conditioning Co. of Dayton is installing 16 Airtemp 3-hp. radial compressor air-conditioning units in the radio laboratories at Wright Field, U. S. Army Air Corps experimental station near here.

The units, which will supply about 45 tons of refrigeration, will provide complete summer air conditioning and partial winter conditioning. Cost of completed job is about \$8,000.

Alfred Natkin Transferred To Tulsa Office

TULSA, Okla.—Alfred Natkin, manager of the Wichita, Kan., office of Natkin & Co., has been transferred to the local headquarters of the Westinghouse air-conditioning firm. The change was necessitated by the large increase in demand for home air-conditioning installations in the Tulsa area, said Bert Natkin, general manager here.

Park Radio, Inc., Baltimore, Moves To New Quarters

BALTIMORE—Park Radio, Inc., operating a refrigeration, radio, and major appliance sales and service business, has moved from 604 W. North Ave. to a building purchased by the firm at 1308 N. Charles St.

Southern Furniture To Handle Fairbanks-Morse

LITTLE ROCK, Ark.—Southern Furniture Co. has been appointed local dealer for Fairbanks-Morse refrigerators and other household appliances. Henry M. Hamilton, former Fairbanks-Morse representative here, is sales manager of the electric appliance department.

Abraham & Straus Opens Branch In Jamaica

JAMAICA, N. Y.—A new retail branch store with a 100-seat auditorium in the basement for appliance demonstrations and domestic science lectures has been opened here by Abraham & Straus, Brooklyn appliance firm.

Chicago Hotpoint Area Sells \$75,000 In Day

CHICAGO—Celebrating "Axel Kahn Day" in honor of their district manager, salesmen of the Chicago district of General Electric Supply Corp. on May 27 sold \$75,000 worth of Hotpoint electric refrigerators to establish what is thought to be a new one-day sales record for the industry.

Salesmen and dealers in Chicago, Indianapolis, and Rockford, Ill. were for the most part responsible for the one-day deluge of orders.

H. N. Newbold, district appliance sales manager; Paul D. Loser, branch appliance sales manager in Indianapolis; and S. E. Smith, Rockford branch manager, sponsored the event.

Hagerman Heads Norge Co. Advertising In Missouri

ST. LOUIS—Lou Hagerman has been appointed sales promotion and advertising manager of Norge Co. of Missouri here, succeeding Henry Rethwisch, who has joined Carrier Products Corp., local air-conditioning firm.

Norge Co. of Missouri sales are directed by A. E. Bottenfeld, president.

Cook-Waycross Salesmen 110% Above Quota

WAYCROSS, Ga.—The five salesmen of Cook-Waycross Co., Crosley dealer here, have been responsible for lifting sales of electric refrigerators 110% over their quota for the year, reports H. L. Bryson, president of the company.

The salesmen are H. O. Williams, J. H. Brisco, B. A. Wheeler, Henry L. Baker, R. L. Clayton, and F. H. Dunbar.

Appliances, Inc., Dayton, Adds New Lines

DAYTON, Ohio—Local branch of Appliances, Inc., general appliance distributor in southern Ohio, has taken on distributorship of Crown gas and electric ranges, Frederick stokers, Dutch Oven gas ranges, and Glo-Boy and Ray-Boy oil heaters, Clyde Graham, manager, has announced.

Tri-State Handles Airtemp

EVANSVILLE, Ind.—Tri-State Plumbing & Heating Co., 1114 Main St., has been appointed dealer for Airtemp air conditioning.

Minst Named By F-M

LEBANON, Ohio—Carl Minst has been appointed local dealer of the complete line of Fairbanks-Morse appliances by Appliances, Inc., Dayton, F-M distributor in southern Ohio.

Schwartz Heads Appliance Dept. Of Epstein's

BALTIMORE—Louis Schwartz, former appliance salesman for Peoples Electrical Supply Co., Grunow distributor, has been appointed manager of the major appliance department of Epstein's Greater Department Stores here.

Mid-States Industrial Distributes Airtemp

ROCKFORD, Ill.—Mid-States Industrial Corp. has been appointed distributor here for Airtemp, Inc. C. W. Litsey is president and R. G. Babcock secretary-treasurer of the new distributorship.

Miller Adds Hotpoint Line

CHARLESTON, S. C.—Miller Furniture Co., 216 King St., has been named dealer of Hotpoint electrical appliances.

*You Can RELY On This
"NEW TYPE OF CRAFTSMAN"
TO REDUCE YOUR SERVICE AND
INSTALLATION COSTS . . .*

*More Than
100 Manufacturers
OFFICIALLY ENDORSE
AND RECOMMEND
THIS TRAINING*



MR. EMPLOYER—Why risk the good name, success, and profits of your business on the guess-work of inadequately trained men when, thru the Refrigeration and Air Conditioning Institute, you can easily get a man to do your installation and service work who has been scientifically and practically *trained* to do this work the way it ought to be done, and the way you want it done?

1000 hours of home-study, backed by two weeks (soon to be four) of intensive work in our shops in Chicago where they have had to dismantle, rebuild, install, and service all conventional air conditioning and refrigeration equipment—makes our graduates, we believe, the most practical and competent installation and service men ever produced for any industry. And so thorough has been their training,—and so wide is its scope,—that it is very likely that many of these men will eventually go away beyond the service stage and become first-class Sales or Application Engineers.

This *New Type of Craftsman*—for it is a new type of Craftsman that has been created,—has been trained especially to fit your needs. To employ him means adding a capable, intelligent, properly trained man to your staff, without costly training expense on your part. He becomes a definite asset to your company, almost from the first day he is on the job. And in the event that your service department has been losing money, he should be able to turn that operating loss into an operating profit.

In fact, so well is this job of Training being done,—and so careful is the Institute in selecting men for Training,—that, today, more than a *hundred* manufacturers in the industry are "officially" endorsing the Institute's work, and unhesitatingly recommending its graduates to the consideration of their thousands of distributors and dealers, everywhere.

Some seven or eight of the biggest of these manufacturers have even gone so far as to appoint some of their own engineers and executives to a Board of Governors, whose duty it is to direct and supervise this training to make sure that men taking it are trained exactly as the Industry wants them trained. These men come to the Institute from the various cities where their plants are located, for regular conferences with the Institute's staff; and at these meetings every phase of the Institute's training program is gone into carefully, the idea being to make it the most practical and successful method of training ever devised.

Be on the safe side by selecting your refrigeration and air conditioning employees from men trained by the Refrigeration & Air Conditioning Institute. The individual qualifications of every graduate are recorded in a form which enables you to select at a glance the man best suited for your needs. And as our services are free to employer and graduate alike, don't hesitate to let us serve you.

Raymond Smith
PRESIDENT

REFRIGERATION & AIR CONDITIONING INSTITUTE
2130-2158 LAWRENCE AVENUE **CHICAGO, ILL.**

Starting a National Movement For Better Business

Last week, in 22 cities, the National Salesmen's Crusade, originated by Nash-Kelvinator Corp. in the belief that individual sales effort, cooperatively applied, can lead the way back to prosperity and by increasing purchasing power relieve unemployment, got under way with the "kick-off" meeting in New York City.

This week, 39 more cities join the movement under the "Sales Mean Jobs" banner, as told on page 1 of this week's NEWS.

Leaders in America's industrial, financial, and business circles helped get last week's inaugural meeting off to a flying start. Published on this and the opposite page are excerpts from speeches made by Nash-Kelvinator President George W. Mason; James G. Blaine, president of Marine Midland Trust Co. of New York; Merle Thorpe, editor of Nation's Business; and H. W. Burritt, Kelvinator division vice president in charge of sales.

Some of the business philosophy expounded by these men is worthy of imitation by all branches of American industry.

Sales Effort Is Greatest Force Back Of Return Of Prosperity, Mason Says

By George W. Mason, President, Nash-Kelvinator Corp.

In any period of bad business such as this country has recently been experiencing, the most difficult problem that faces any business man is that of having to reduce the number of people on his payroll.

We recognize that probably in the majority of cases it is a personal and family catastrophe for a man to lose his job.

And it is the duty and responsibility of business men to put forth every effort so that men now unemployed may go back to work.

That is why our attention today is focused on sales.

Nothing other than the realization that "Sales Mean Jobs" would have induced me to go to Lincoln, Neb., and ring doorbells.

Nothing else than the realization that "Sales Mean Jobs" would have brought me here today to talk to you about the responsibility of the salesmen in our present situation.

It is my belief that too much has been said and printed about the curtailed purchasing power.

The truth is, that there is as much wealth in this country today as there was at the peak of the greatest boom that business has ever known. There are as many dollars, as many buildings, as many homes, as much in natural resources, and as much in productive capacity, as there ever has been.

But in our country prosperity and employment depend on business, and business depends on sales.

Work creates wealth . . . and salesmanship is just as much a part of wealth-creating work as any other activity that men can engage in.

Even the products of the farm have no value unless they can be sold, distributed, and made available in individual homes as food. The products that we build in our factories are of no use there. They are of no value to distributors or dealers. They become valuable only when the creative work of salesmanship has been added to the creative work of invention and manufacture, and they find their usefulness in the hands of a customer.

The National Salesmen's Crusade in Lincoln, Neb., gave to the people in that city and state a better realization of the service rendered by the salesman; and the salesmen of Nebraska have a better realization of the important part they are playing in the restoration of American employment and prosperity.

I know of no harder job in industry, no job that requires greater intelligence, greater ability, greater driving force, and greater self-management than that of a salesman. And I know of no single factor than can have a greater influence on the restoration of American prosperity than that of salesmanship.

Crusade Based On Sound, Workable Plan, Says New York Bank President

By James G. Blaine, President, Marine Midland Trust Co.

The difficulties which beset us today are those which come to every nation when social readjustment follows great social unrest. The whole world has been affected by social unrest since the World War, and despite our theoretical isolation, we have not escaped it either.

It is not easy for business and finance to adjust themselves to new thoughts and to new practices, nor should they seek to adjust themselves to things unsound. But business and finance must and they will adjust themselves to new conditions because social progress is the strongest force in a democratic nation.

Business and finance are inextricably interwoven in the whole fabric of social relations. When the pendulum of social progress swings, it is inevitable that it swings too far. When it has run its course, it swings back, but never so far as to the point from whence it came. When it halts on its return, the stopping point is ahead of the starting point. And the difference is what we call progress. The pendulum is now swinging back, and the primary problem of business and finance is to align themselves to the new conditions, because we will never return to the old.

COOPERATION NEEDED

Business and government must cooperate. Because it is for the best interests of all that they should. Business and government will cooperate, because in the end the American people will want both to adjust their differences.

In the meantime, we as individual business men cannot and must not remain idle in the hope that something favorable will develop to improve business. That is the easy thing to do and prosperity is never achieved by doing the easy thing. The only formula I know of to gain an objective is hard work, and my own feeling is that the harder times are the harder we must work to overcome them.

PRODUCTION OVER-EMPHASIZED

We are living in an industrial age, and ours is an industrial nation. For the past half century and more, we have been busying ourselves with new inventions, new methods of manufacture designed to reduce production costs to a point that would bring new comforts and convenience within the reach of everyone. We have seen this as a "raising of the standard of living."

For a long time, leaders in industry have had their attention focused on production methods:—where to secure materials best suited to their manufacturing processes? How to reduce production costs to reach the largest possible market. Production problems.

TRAINED IN SHOP

And this is understandable since so many of the leaders in American business are either engineers or graduates of those intensely practical courses that start with an apprenticeship in a shop and take the student from machine to machine, and from job to job, until he finally finds himself in the president's chair.

Today the industrial leader is examining another side of his business. Without relaxing his efforts to produce better products at lower cost

Campaign Will Start Much-Needed Revival Of Real Selling, Merle Thorpe Believes

By Merle Thorpe, Editor, Nation's Business

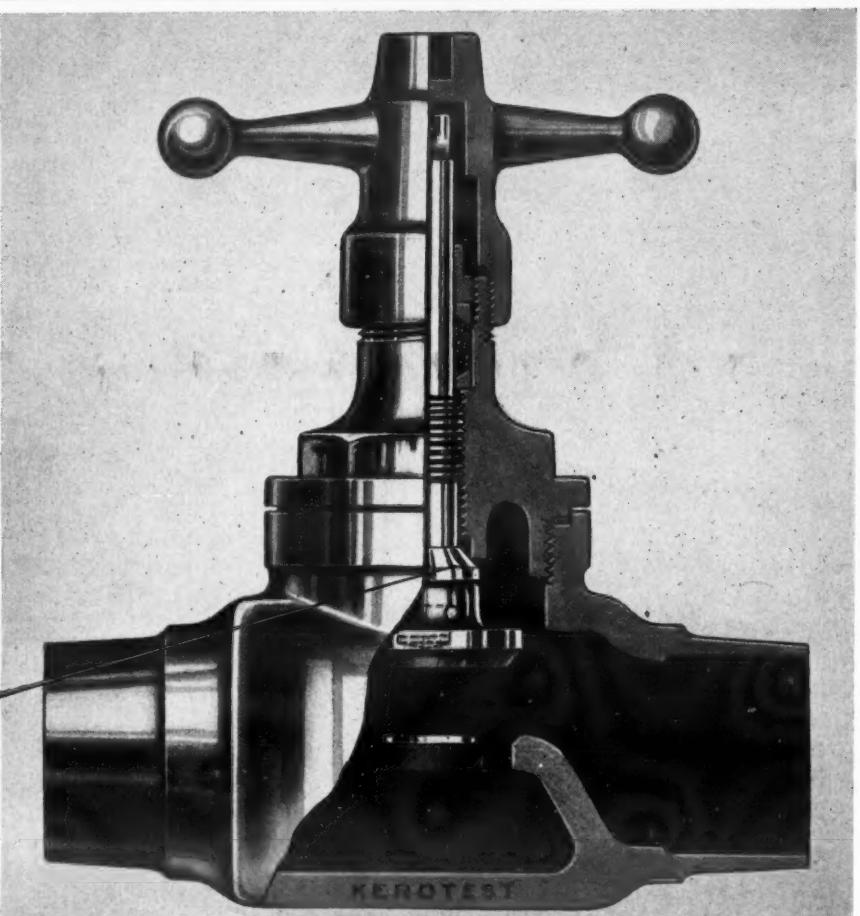
This simple, American commonsense program to stimulate trade and to make business better appeals to me, first, because it is based upon action, upon the old-time American plan of doing something for ourselves. There has been too much shirking and waiting for government magic to bring better times.

This program appeals to me, secondly, because, if there is one thing I have learned about business, both by experience and observation, it is that trade is not a static thing. It is not self-starting. It's moved by human impulses. We exchange our labor and goods and services only to improve our well-being, the profit motive.

That makes us cautious. We consider, hold back, hesitate, until we are certain it is to our advantage or benefit to give up what we have for something else. Human beings are just that way—you and I and all of us.

We don't like to change our assets, or take on new obligations. We'd rather wait.

What arouses us to buy—to give up something we have for something you have? You've guessed it—selling. Showing us something—a product or service, describing it and its advantages to us, arguing and exhorting and persuading, to the end that we acquire that something and (Concluded on Page 5, Column 1)



KEROTEST

REFRIGERATION VALVES AND FITTINGS BUILT TO THE HIGHEST SERVICE STANDARD . . . NEVER TO A PRICE!

IT has been truly said that all works of quality must bear a price in proportion to the skill, time, expense and risk attending their manufacture . . . those things called dear, are, when justly estimated, the cheapest.

This applies to Kerotest Valves, Fittings and Accessories in general and to the widely specified Kerotest Bronze Globe Valves in particular. Progressive design and true craftsmanship dominate their entire man-

ufacture. Enduring trouble-free service is meticulously built into every Kerotest unit step by step.

Just divide their cost by the years they last and you will discover the plus value built into Kerotest Valves, Fittings and Accessories—why Kerotests are considered an asset by leading manufacturers of refrigerating units throughout the industry.

Warehouse Stocks are carried by Kerotest Jobbers everywhere.

KEROTEST

KEROTEST MANUFACTURING COMPANY
PITTSBURGH, PA.

Drive Will Snap Up Sales From 8-Year Layoff, Says Editor

(Concluded from Page 4, Column 5) thus improve our well-being. That is selling in the highest sense.

We talk glibly about supply and demand, but we, the public, did not really demand the things that are good for us. They have to be sold to us. We all have often heard of the seriousness of a buyers' strike. But a buyers' strike is as nothing in the way of national calamity compared to a sellers' strike.

Suppose every salesman of the good things of life were to lose his enthusiasm and throw down his sample case; suppose every sales manager were to resign? Every advertising and promotion man lose his faith? Suppose, for example, those dogged pluggers for insurance decided not to "come in again"? Suppose all those brisk evangelists of all the good things called it a day and quit the country cold?

IF SELLING STOPPED

Then you would have a depression. It is not too much to say that there would be a collapse of civilization. Standards of living would tumble. Obsolescence would rule. Stagnation would take the place of turn-over; unemployment and frozen assets would be the order of the day. This is no overstatement.

Salesmanship means just that to progress. We must have this pressure upon us if we are to move ahead. We should still be riding over cobblestones with ironbound wheels if it had not been for the energetic salesmen of Detroit and Akron.

In my judgment there has never been a time in recent history when selling was at such a low ebb in the United States. We crumpled up eight years ago, lost our courage, and hunted for alibis. The first one, you will recall, was over-production. But over-production is only a lazy synonym for under-consumption.

IT CAN BE DONE

Selling has cracked the hard nut of under-consumption many a time in the United States. And we can do it again. There are millions eager for more and better food, for warmer clothing, more comfortable shelter. There are millions who desire greater conveniences; millions who yearn for the luxuries of travel, art, music, books. They are willing to work hard and exchange their labor and services for those things.

Selling will do the job. But the salesmen cannot work alone. They must have the wholehearted support of the sales managers. And sales managers must likewise have the wholehearted support of the higher-ups. I have seen many a fine campaign brought forth after careful study and with enthusiasm, only to have the president throw it on the rocks with a discouraging, "Can't take it up now; let's see what's going to happen this next month." Cold water from the top has too often brought discouragement all the way down the line to the humblest salesmen.

EVERYBODY'S JOB

To the everlasting credit of American salesmanship, there are few who have kept the faith during these hard years. And these few are ready to furnish the leadership and example now for the National Salesmen's Crusade.

The United States has been kept, until recently, a going concern by this indestructible spirit of its salesmen. For a long period now we have suffered from a stagnation, a slowing down of the exchange of goods, services, and labor. None of us likes it. We pray for business recovery. We shall only get it when each one of us redoubles his efforts in selling what he has to the other fellow, and, at the same time, is willing to listen to the claims the other fellow makes for what he has to sell.

So, in bringing back the active exchange of goods, services, and labor we once had, the work cannot be delegated. George can't do it—alone. (Even George Mason, Master Salesman). But you, the people, we, the individuals, each in his own field, can rebuild the walls, can start America again on the up road to the greatest prosperity and well-being we have yet known.

Salesman Has Great Chance To Help Solve Unemployment Problem, Burritt Declares

By H. W. Burritt, Vice President in Charge of Sales
Nash-Kelvinator Corp.

The National Salesmen's Crusade is based on five self-evident truths: 1. Unemployment is a national problem.

2. Though undoubtedly impaired, the ability to buy still exists among our citizens. Though millions are unemployed, many other millions are at work.

3. A definite step toward the re-employment of the unemployed is the sale in increased quantities of our farm and factory products to those who are at work. This will create employment and—with the restoration to buying power of those now living on a subsistence scale—we can expect a constantly accelerated demand for these products.

4. The American Salesman faces a remarkable opportunity to be of help in solving the unemployment problem. It is his task to strengthen old and create new desires to a point where the desires outweigh the fears that have kept people from satisfying their normal needs.

JOBS MEAN SALES, TOO

The fifth point is—that the business of any manufacturer or any industry will be helped by the success of other manufacturers or other industries. These five basic truths are responsible for the National Salesmen's Crusade. All five boil down to the simple phrase, "Sales Mean Jobs." When people have jobs they buy things so, "Jobs Mean Sales" and the circle making for re-employment is complete.

As a preliminary to the presentation of the crusade for the consideration of all business, we needed proof that these truths about hard work and fundamentals were as practical as ever. We chose Lincoln, Neb., as our proving ground. Since the idea embraced all business, our program scheduled a call on the general manager of the Chamber of Commerce. He immediately called a session of its board of directors. And from that moment the Lincoln Chamber of Commerce has been lending every aid to the National Salesmen's Crusade.

ENTHUSIASTIC SUPPORT

Mayor Copeland next. He thought the crusade would help business. He was ready to cooperate. Governor Cochrane. An audience scheduled for 10 minutes grew into an hour as he discussed the far-reaching possibilities of the idea.

Mr. Gildersleeve of the Iowa-Nebraska Light & Power Co. They handle a competing line of products. Loyal supporters of the crusade from the moment they heard the story. They ran an advertising program in its support! And department stores and dealers handling competing products were as strong for the crusade as were we.

The newspapers. Just a bit skeptical at first, but ready to go along if they didn't find the whole thing a stunt. And when they found that everything was as represented, their support was enthusiastic.

THE MOVEMENT STARTS

Sunday May 15. The first hint of the launching of the National Salesmen's Crusade appeared in the Lincoln newspapers. No attempt to disguise the fact that folks were going to be asked to buy a lot of different things by a lot of different people. The announcement appeared on page 2.

Monday, May 16. Stores asking questions. Newspaper stories on the editorial page. Window cards for every store, saying National Salesmen's Crusade. "Sales Mean Jobs." "We Are Cooperating."

Tuesday, May 17. A mass meeting of 1,800 dealers and retail salesmen called by the Chamber of Commerce. The retail salespeople—the dealers—heard that all there was to the plan was that they were to work harder—and that that would make jobs for people now unemployed. People behind the counter were to pledge themselves to an attempt to make more sales. Salesmen working on a specialty basis were to pledge themselves to make at least 10 calls a day. And that crowd actually cheered the idea of working harder.

Wednesday, May 18. Early morning sales meetings in all the larger

stores. Newspaper stories on the first page now. Our party arrived to find a city gay with flags. Crusade cards in every window. Crusade buttons everywhere.

Our distributor in Lincoln held a breakfast. His dealer organization, Chamber of Commerce officials, utility representatives, the mayor of Lincoln, the governor of Nebraska, and our distributors' competitors were there. Lincoln radio stations broadcast the proceedings as a sustaining feature that all Nebraska business might listen in.

Gov. Cochrane gave a ringing keynote address. Dealers and salesmen signed their pledges and the crusade was under way. Out-of-town dealers hurried home and Lincoln salesmen went to work. With them went George Mason and all his sales executives.

TEARS UP CARDS

Mr. Mason had demanded 10 prospect cards and started to go out. As he left the breakfast room, sales kit under his arm and prospect cards in his hand, a Chicago newspaper man advanced a skeptical suggestion. He suggested that the cards might possibly be just a little better than run-of-mine quality—the cream of the crop in fact.

Mr. Mason accepted his challenge, tore up the prospect cards and

started out on a cold canvass. He made 14 calls at homes picked by the newspaper man, and had the door slammed in his face at one house, found three good prospects, and got one definite promise to buy within three days. On the third day he received word that the promise had been kept. Last week another of his prospects bought.

Our crowd was not the only one at work. One woman said that her doorbell had been rung six times in two hours. And smiled as she said it. That was the most amazing thing of all to us. The attitude of the public. They looked pleasant every time they saw a crusader's button. The idea had swept across the city like a prairie fire.

BRINGS RESULTS

One woman phoned that she had heard a broadcast about the crusade and felt it her duty to buy something. Would the department store send out a salesman? They did and she bought a refrigerator.

One competitor's sales, we are told, went up 50%.

A woman who bought on Thursday brought a neighbor down on Friday and stood by until another sale had been made.

A motor car dealer increased his sales 300% over the week before.

A department store reported that the first 433 calls yielded 98 electric refrigerator prospects and 42 sales. One sale to every 10% calls.

A motor car dealer who had sold one used car from May 1 to May 18 sold eight used and eight new cars during the first two weeks of the crusade.

This was the start of the National Salesmen's Crusade.

The Lincoln Chamber of Commerce on its own initiative is organizing the activities of other chambers in a radius of 500 miles.

A mass meeting of the city's business leaders and 4,000 salespeople is being planned for Symphony Hall in Boston.

The Electrical League of Cleveland, working with the chamber of commerce, state that they will launch the crusade at a meeting of 15,000 salespeople to be held in the Public Auditorium.

This week the Peoria Chamber of Commerce is starting a crusade program with all business participating.

Plans are under way for the starting of the crusade under Chamber of Commerce sponsorship in Akron, Ohio, and Birmingham, Ala.

At Providence the Chamber of Commerce is staging a meeting today. A large audience is listening to this program.

IDEA SPREADS

The Kansas City Post heard of the crusade, ran front-page newspaper stories. A mass meeting was held and a program started on June 6.

The Seattle Post-Intelligencer is running a series of first-page double-column editorials paving the way for a crusade.

The mayor of Portland, Ore., working with the Chamber of Commerce, called a meeting last week. It was attended by a thousand retail dealers—the capacity of the hall. An overflow meeting of 500 was held in a nearby park.

The Michigan State Chamber of Commerce has asked some 60 constituent chambers throughout the state to launch campaigns.

FIRST in Insulation

Because of the many inherent advantages of Fiberglas Insulating Wool, manufacturers of such widely varied products as locomotives, stoves, refrigerator cars, marine boilers, ships, trucks and busses have made it—**FIRST IN INSULATION**. Check over the reasons why Fiberglas is superior. You'll find that they can be utilized to improve the operation as well as add sales stimulus to your product.

1. Light Weight (from 1 1/4 lb. per cubic foot up)
2. Non-Inflammability
3. Extremely Low Moisture Absorption
4. High Insulating Value
5. Freedom from Rotting
6. Rodent-, Vermin- and Termite-Proof
7. Fungus- and Bacteria-Proof
8. Permanence
9. Sulphur-Free and Non-Corrosive
10. Resistance to Acids
11. Resiliency and Flexibility (Non-Setting)
12. Sound Absorption
13. Freedom from Odors
14. Non-Absorption of Odors
15. Ease and Economy of Installation

"First in Glass" Fiberglas insulation is a scientific improvement on the processes of nature. Highly trained scientists and technicians, specializing in glass, working in one of the finest equipped research and experimental laboratories in the world, have brought it to its present state of perfection. Because of precision in manufacture, it is uniform in quality. For complete data and samples, write to the Industrial and Structural Products Division, Owens-Illinois Glass Company, Toledo, Ohio.

FIBERGLAS Insulating Wool is manufactured by the OWENS-ILLINOIS GLASS COMPANY ... world's largest manufacturers of GLASS CONTAINERS, and producers of FIBERGLAS Insulating Blankets and Electrical Insulation, DUST-STOP Replacement-Type Air Filters and INSULUX Glass Block.

OWENS-ILLINOIS
Fiberglas
THE MODERN INSULATION

Specialty Selling Methods

Widespread Advertising and Promotion Feature Cleveland League's Drive

CLEVELAND—Spring electric refrigeration campaign of the Electrical League of Cleveland was opened by a series of advertisements, stressing the theme "An Electric Refrigerator Pays for Itself," and appearing in all local metropolitan daily newspapers, 24 community papers, and 20 foreign language papers.

Illuminated billboards also were used during the campaign to bring the "pays for itself" message to the attention of the public. An exhibition of refrigerators also featuring the message was staged by distributors in the league's display windows.

Demonstrations of refrigerators were given in connection with cooking schools in community centers, and appeals to health, convenience, and economy were dramatized.

Accurate prospect lists were made available in lots of 1,000 as a service of the league for its members. In addition, names of 4,300 depositors in a closed bank to whom refunds recently were given were obtained by the league to help salesmen "go where the money is."

A 16-page illustrated booklet, titled with the campaign's theme, was furnished to members by the league as a gift for prospects.

Calling an electric refrigerator a "safe" for money invested in food, the booklet tells how to use the appliance properly, and includes eight pages of recipes.

A leaflet, salesmen's guide, home demonstration portfolio and colored window banner also were part of the promotional material furnished by the league.

In a special cooperative direct mail campaign, dealers furnished mailing lists and mailing pieces and paid half the postage, and the league paid the other half of the postage and addressed and mailed the literature.

With the assistance of the merchandise division of the league, dealers scheduled demonstrations in their own stores conducted by league-trained refrigerator demonstrators.

Dealer members also were offered the services of professional telephone solicitors, and dealers who could provide uninterrupted service on separate lines might use this means to make appointments for their salesmen.

Breakfast meetings for salesmen were held during the campaign, with prominent men in the refrigeration industry invited as guest speakers.

Dealer Delays Giving Guarantee To Allow Follow-Up On Sales

OTTAWA, Kan.—W. M. Blair, Frigidaire, Hotpoint, and Westinghouse dealer here, sells refrigerators without a guarantee—at least the purchaser doesn't receive the guarantee at the time the sale is made.

But this bit of scheming is all a part of the double-barreled follow-up plan which forms an integral part of every refrigerator sale made by the Blair organization.

For by not presenting the customer with the guarantee when the sale is completed, Mr. Blair paves the way for the first follow-up call. He makes this call personally, within a fortnight after the sale, for the nominal purpose of delivering the guarantee.

But the call serves other purposes, too, for any questions about the unit or its operation can be clarified at this time. And besides, Mr. Blair argues, the guarantee has more meaning after the purchaser has used the box for a while.

Second call is made by the salesman who was responsible for the sale. Ostenstible reason for this call is to give the customer a recipe book, memo pad, or some similar gift. In reality, however, the salesman is bent upon finding out two things: first, what appliance the customer is planning on buying next; and second, what friends of the purchaser are interested in buying appliances.

And both of these calls, Mr. Blair reports, usually result in a little added goodwill for the store.

Canvassers Given Share Of Closers' Commissions By Dealer Recognizing 2 Types Of Salesmen

YONKERS, N. Y.—Two entirely different types of salesmen—those who are good canvassers and those who seem to have a facility for closing sales—are employed by Joseph C. Ryan, of Joseph Ryan & Sons, Inc., local refrigeration dealer.

"Many a high caliber salesman, efficient in closing sales, is aggravated by the time spent in securing prospects," explains Mr. Ryan. "On the contrary, you will find scores of salesmen who consider a certain amount of doorbell pushing as simply part of the day's work. These men know the refrigerator thoroughly, and can answer any questions regarding it, but seem to lack the enthusiasm and push necessary to close a sale.

"We recognize this difference, and realize that neither type of man can do a first-rate selling job from start to finish—so we employ both types. It takes two canvassers to dig up enough prospects to keep one salesman busy, so we employ six of the former and three of the latter.

"Canvassers are paid \$1 a day, plus 3% commission on all sales resulting from the prospects they turn in. Salesmen receive a 10% commission, from which the canvasser's 3% is deducted. This deduction is justified by the fact that the salesman can work twice as fast, since he wastes no time on unqualified prospects.

"Another peculiarity of our setup is the fact that canvassers are not required to turn in a card on each contact made. It is a waste of time to fill out cards on persons who are not interested, we feel.

"About one family out of every 25 contacted is a qualified prospect. On such calls, we require our canvassers to obtain full information—name, address, telephone number, type of refrigerator possessed, etc.

"Sales are made to approximately three out of every five qualified prospects turned in. On this basis, the really good salesmen are able to earn excellent incomes. The canvassers, too, are well satisfied, for they can count on receiving a commission on more than half of the prospect cards they turn in.

"Knowing that their commission depends not on the number of cards they turn in, but rather on the number of sales that are made from these cards, the canvassers spend more time in laying the foundation for a sale whenever they uncover an interested prospect than in seeing how many calls they can make in a day.

"Most of the sales are made in the store, the salesman calling for prospects in his own car and taking them back to their homes after the visit to the salesroom. The canvassers do not require cars, as theirs is a door-to-door business."

Dealer's 'Three Musketeers' Split Their Commissions Into Equal Shares; Men Cooperate, Dealer Says

PAOLA, Kan.—By adopting the Three Musketeers' slogan of "One for All and All for One," L. F. Metzler, owner of Metzler's Furniture & Appliance store here, has eliminated rivalry between his salesmen, and has increased by 25% his sales of Frigidaire and Servel Electrolux refrigerators.

The Metzler appliance selling crew consists of three men, working mostly outside of the store, and although they still sell on a commission basis, the salesmen share equally in the pooled earnings.

By splitting total commissions into three equal shares, Mr. Metzler finds, the morale of the salesmen is elevated and greater sales effort is expended.

There is full cooperation between the men in an open field, with no restricted territories, Mr. Metzler says.

All three get leads and prospects. One of the trio is particularly successful in the farm market and also has a unique ability to close sales, averaging 50% of all made, Mr. Metzler declared, but he recognizes the abilities of the other two and willingly shares in the commissions.

Cost Comparison Display Builds Floor Traffic

OAKLAND, Calif.—A window display comparing upkeep costs of an old ice box and a modern electric refrigerator, shown side by side in front of a setting of manufacturers' lithographs, proved a floor-traffic builder for Scholl & Lehrman, appliance dealer here.

On a card attached to the ice box was the message: "In 1923 this ice box sold for \$69.50, plus a weekly upkeep cost of \$1.50, or \$78 a year. The upkeep of this box for 18 months, plus the initial cost, more than pays for the new 1938 electric refrigerator."

On the electric refrigerator was one of the "Penguin" cards issued by the Electric Appliance Society of Northern California (pictured on page 1 of the May 11 issue of AIR CONDITIONING & REFRIGERATION NEWS). The card shows savings of \$2.53 a week, or \$10.96 a month, "more than enough to meet the small monthly payments."

One salesman is effective in urban sales, and the third is a natural master at the art of approaching anybody and opening sales talks. With this divided variety of talent, three men can help each other at any time, and are able to cooperate in making sales.

The Metzler "share alike" plan evolved from another one used during the past six months, in which each salesman received a full half of the commission on every sale and shared the other half equally with his two fellow salesmen.

Trailer Closes Sales At Prospects' Homes

NEW ORLEANS—Valuable as a sales closer is the large automobile trailer recently added to its equipment by Helshro Electric & Radio Shop, Norge dealer here.

After salesmen have classified prospects through cold canvass or user-lead calls during the day, the trailer is driven out to the home of likely prospects at night, when both husband and wife are known to be home, and used to demonstrate the appliances.

Salesmen report this a very effective means of meeting the protest problem on the part of prospects who are asked to call at the dealership's headquarters to inspect the appliances. In addition, it is much more convenient for the prospect.

The trailer, a standard type used for the display of appliances, is completely equipped with the company's line of appliances.

Canadian Concern Reports Increase This Year

TORONTO, Ont., Canada—Rogers Majestic Corp., Ltd., reports a marked increase in volume of refrigerator sales for the first three months of this year.

The company's report, now in preparation and due to appear late in July, will show substantial advances in business by all departments for the fiscal year ending March 31, 1938, according to information released in financial circles.

TOMORROW'S REFRIGERATION TODAY Our complete line not only meets present needs but is



Write for information covering the GR-Lipman refrigeration franchise.

GENERAL REFRIGERATION CORPORATION

Dept. F-5, Beloit, Wisconsin, U.S.A.

been approached by the local business distributor.

Commercial Refrigeration

New Quick-Freezing Plant Inspected By A.S.R.E. In Los Angeles

LOS ANGELES—An inspection trip through the new quick-freezing plant of California Consumers Corp. in Pasadena featured the May meeting of the Los Angeles section of the American Society of Refrigerating Engineers.

In operation for a little more than a month, the new plant contains the latest equipment and facilities for the quick freezing of fruits, vegetables, and other foods.

Prior to the visit, an educational talk on the frosted foods industry and problems involved in the merchandising of the products was given by R. E. Henning of E. I. du Pont de Nemours & Co., Inc. Mr. Henning also discussed problems involved in packaging quick-frozen food products.

The May meeting was the last of the season for the Los Angeles section, although a special inspection trip was scheduled for June 7 in conjunction with the Los Angeles chapter of the American Society of Heating & Ventilating Engineers.

The two groups inspected the new plant of the Helms Bakeries here, which feature a complete air-conditioning system. A showing of the York Ice Machinery Corp. motion picture, "Cold Magic," preceded the trip, and a talk on "Air Conditioned Labeled Systems" was given by O. W. Ott, consulting engineer, after the tour.

Officers and board of directors of the A.S.R.E. section, elected for the next fiscal year beginning June 1, are: Van D. Clothier, chairman; D. de Fremery, vice chairman; David D. Cornell, secretary-treasurer; and Nels H. Rosber, J. C. Blair, and Herman Vetter, directors.

Unit Cooler Defrosted By Electric Heater

TRENTON, N. J.—The Kramer "Freezing Oven," a low temperature unit cooler with a self-contained electrical defrosting system, has just been introduced by Trenton Auto Radiator Works here.

Complete unit is housed in an insulated shell, with insulated front and rear adjustable louvers. By shutting the suction hand valve which is mounted on the unit, closing the louvers, and turning on the electrical heater, the unit becomes an insulated electrical oven.

Whole defrosting process, the company says, is accomplished in approximately 20 to 30 minutes, without materially affecting the temperature of the cooler. No special skill is required to operate the "oven" unit, it is stated.

Installation of the cooler is the same as any unit cooler, except for the additional wiring to the electrical heater. Full installation instructions are furnished with each unit.

The "Freezing Oven," according to Kramer engineers, furnishes low temperature refrigeration at lower cost than ordinary pipe coil, takes up less space than pipe, provides uniform distribution of refrigeration in the cooler, and defrosts easily without materially raising cooler temperatures.

The unit comprises a low-temperature evaporator of $\frac{1}{2}$ -inch copper tubing with $\frac{1}{2}$ -inch fin spacing, fin sweated to tube; an electric heater; suction line hand valve mounted on shell, shunted by a relief valve; insulated steel housing, with insulated adjustable front and rear louvers; and specially designed silent fan, driven by totally enclosed fan-duty motor designed for continuous operation.

Morson & Brock Get Posts With Harten & Knodel

DAYTON, Ohio—Lee Morson has been appointed sales manager, and Gilmer Brock service manager, of the local branch of Harten & Knodel Distributing Co., Norge refrigerator distributor.

Open Fruit Display Case Is Announced By Bulman Co.

GRAND RAPIDS, Mich.—Eight models of its "Frigidew" open-display fruit and vegetable cases for food stores and super markets have been announced by the E. O. Bulman Mfg. Co., Inc., manufacturer of the units.

Chief advantage claimed for the "Frigidew" is that it provides both cooling and humidification, keeping fresh produce fresh and crisp and maintaining its high water content, and at the same time permitting open display which makes it easier for customers to handle and select the goods.

Cooling is accomplished by means of a $\frac{1}{4}$ -hp. twin-cylinder unit, connected to an all-steel cooler with an insulation 2 inches thick. From the cooler, water is forced out through pressure-heads over the produce, producing a fine spray. The produce itself rests on a heavy mesh deck below which is a refrigerated humidification chamber.

This chamber, the company asserts, creates high humidities, and the chilled, moisture-laden air circulates to cool and dampen undersides of produce. The chamber is cooled by 30 feet of coils, resting in a humidifying tank.

For further attraction to customers, each display stand is equipped with a drinking fountain, with glass bowl and china bubbler nozzle. Water is piped direct from the cooler.

Models in the "Frigidew" line are available in either six or nine-foot lengths. Model F941 (or F641) is designed for wall or counter line use, and has a front height of 31 inches and a rear height of 41 inches, with a depth of 36 inches. All other models in the line have similar front heights and depths. Model F941-C (or F641-C) is similar to the other models just described, except that instead of a closed front it has wire baskets for extra produce display.

Models F952 and F652 have a 12-inch top shelf all the way across the top for box, can, or bottle displays. Rear height of this unit is 52 inches, and it may also be had as model F952-C or F652-C with the front produce baskets arrangement.

Models F974-L and F674-L have rear heights of 74 inches, and are equipped with Lumline lighting consisting of a 4-inch frosted glass panel, bulbs, and plug-in with wiring encased. Panels can be used for sales signs, and the lighted display adds to the attractiveness of the arrangement. In basket style, the units become models F974-CL and F674-CL.

Center-aisle models, permitting displays on either side, are models F931 and F631 with closed front, and models F931-C and F631-C with basket arrangement.

All models are finished with Permalux in a choice of either white and black trim, apple and black trim, and corn yellow and brown trim.

Fruit stacks or shelves may be provided for mass displays above produce deck. In basket models, the baskets are set 8 inches from the floor, to get away from sweeping dust and vermin.

Reco Adds Banana Room Air-Conditioner Line

CANTON, Ohio—A line of horizontal and vertical air-conditioning units, banana room conditioners, and evaporative condensers has been announced by Refrigeration Economics Co. here.

Marketed under the trade name "Reco," the new units range in capacity from 1 to 20 tons, with the exception of the banana room conditioners, which are built in 2 to 5-ton capacities.

All units are equipped with Reco corrugated finned cooling coils, with heating coils optional. Engineers for the company claim the Reco coil has an excellent thermal bond, and that the concentric corrugations on the coils greatly increase the heat transmission.

Coils are built of copper, with aluminum fins, with aluminum tubing and fins for ammonia, and all steel, hot galvanized for all refrigerants. Wilson "Edgeseal" hair wool filters are utilized throughout.

Los Angeles 'Super-Markets' Make Extensive Use Of Refrigeration In Marketing Fruit, Vegetables

LOS ANGELES—Modern produce and meat cooling equipment is playing an important part in the development and operation of this city's many "super-markets."

Residents of Los Angeles are said to eat more fruit and vegetable salads than those of any other United States city. This may be due, in part, to the produce supply, but most of it may be traced to the extensive and inviting produce displays in the "supers." These latter are made possible by use of produce cooling equipment.

Most of the super-markets are huge affairs; for example, the Food Terminal, one of the city's newest, is 98 feet deep and 200 feet long, with a produce display frontage of 250 feet along the store front and part of the 150-car parking lot. Dozens of display stands are in the produce section, loaded with citrus fruits as well as fresh fruits and vegetables.

Stocking a display of that size means heavy buying, with consequent high waste unless proper reserve storage facilities are available. Produce cooler used in a store of this type maintains temperatures between 35 and 40° F., depending on the produce being stored. Controlled humidity also is obtained to keep the produce in perfect condition.

When vegetables come in, they are washed and trimmed and placed in the produce cooler, to remain there until put on the display stands. Some operators using coolers of this type report keeping lettuce in perfect condition as long as a week.

There is practically no weight loss during storage, operators claim. Using this type of equipment, market operators can take advantage of low market conditions on certain vegetables to stock their needs for several days, and pass the resultant savings along to customers, with additional profit for themselves.

Some idea of the size of one of these produce coolers may be obtained by the installation on Foodtown, one of the largest of a string of super-markets operated by Weinsten Bros. and Surval Co. This cooler has a capacity of about one

and one-half carloads. A typical storage stock might include 400 cases of lettuce, 300 crates of celery, and 800 boxes of apples, in addition to smaller quantities of a variety of miscellaneous items.

Produce cooling facilities, in addition to their storage value, also have proved merchandising aids to several "supers." Strawberry sales at the Saving Center, for example, have been greatly increased through proper cooling. Berries, removed from the cooler in small quantities, take on a dewy appearance when exposed to outside temperatures, enhancing their sales appeal.

The market also is able to get one cent extra per pound on watermelon cooled and prepared for customers in its produce cooler.

Most of the super-markets have open fronts, and therefore do not use air conditioning for employee and customer comfort. The Food City at Bakersfield, Calif., however, has recently installed a conditioning system serving both its entire display area and a hall waiting-room for customers who want to come inside and cool off.

In addition to attracting extra patronage, the system has cut losses on displayed produce to the lowest point in the store's history, the operators report.

Brokelman Manages Pelco Sales In New England

BLOOMINGTON, Ill.—Harry Brokelman, former northeastern district manager of the home appliance division of Fairbanks, Morse & Co., has been appointed New England district manager for Pelco electric beverage and beverage-food coolers, E. W. Jones, sales manager for the refrigeration division of Portable Elevator Mfg. Co., has announced.

Mr. Brokelman's headquarters are in Boston. He had been with Fairbanks-Morse for the past few years, and previously had been for five years branch sales manager for a leading appliance manufacturer, and for seven years eastern manager for United American Bosch Corp.



PLANNING—Engineering conferences guide each step in the design of new Servel products.

PROGRESSIVE ENGINEERING

Every step in the manufacture of Servel refrigeration products is closely controlled by expert engineers.

From the analysis of raw materials to the calorimeter testing of completed machines—nothing is left to chance! A competent staff of design engineers, draftsmen, experimental technicians and test men supervise each detail in the improvement of old products and the development

of new products—on paper, in the shop, in the "hot room," in the laboratory.

Through 15 years of continuous research, Servel engineers have perfected hundreds of devices, processes and designs which have made possible the present high efficiency and dependability of Servel products.

A request on your letterhead will bring profitable information.

SERVEL, Inc.
ELECTRIC REFRIGERATION AND AIR CONDITIONING DIVISION
EVANSVILLE, INDIANA

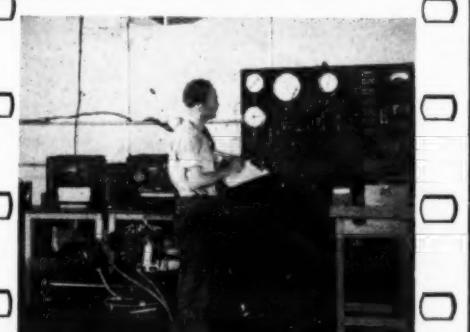
MATERIALS...MACHINES...MANPOWER



DRAFTING—Skilled engineers work out the thousands of detailed drawings which guide the production of Servel machines.



CHEMICAL ANALYSIS—A complete metallurgical laboratory controls the materials used in all parts of Servel products.



PERFORMANCE TESTING—Electric calorimeters and recording instruments determine exact machine capacities.

Foreign News

British Electrical Society Will Study Standardization Of Cabinets

LONDON, England—The Electrical Development Association, prime British electrical society, will consider the matter of household electric refrigerator standardization at its next meeting, reports F. Chatterton, secretary of the Domestic Refrigeration Standardization Committee, which has been seeking recognition of certain cabinet construction requirements.

Mr. Chatterton also reports that the Electrical Committee of the British Standards Institution is considering the possibilities of adopting some general recommended specifications on refrigerators, and suggests that U. S. manufacturers selling the British market take cognizance of this and submit some recommendations.

PRESS ATTENTION

The British electrical trade press has given some attention to the drive for household refrigerator cabinet standards, the "Electrical Times" recently publishing a letter from the committee which said:

"The committee is desirous of drawing your readers' attention to the fact that domestic refrigerators are being advertised as all-steel, which, in point of fact, contain timber and cannot, therefore, be truthfully so described."

'ALL-PORCELAIN' FALSE

"Models are also stated to have an all-porcelain enameled interior, when actually shelf studs, or hooks, are incorporated which are not in themselves porcelain enameled."

The Standardization Committee's recommendations on cabinet construction, on which purchasers of and dealers for electric refrigerators are asked to insist, are:

1. No timber whatever to be used in cabinet construction.
2. Compressed slab cork as an insulating medium to be prohibited.
3. Shelf rests to be pressed out of the metal of the interior, holes drilled to fit studs to be prohibited.
4. Metal to metal connection between cabinet interior and exterior to be prohibited.
5. Evaporators to be made of a substance at least 86% copper.
6. Some system of forced draft cooling to be used in all domestic models.

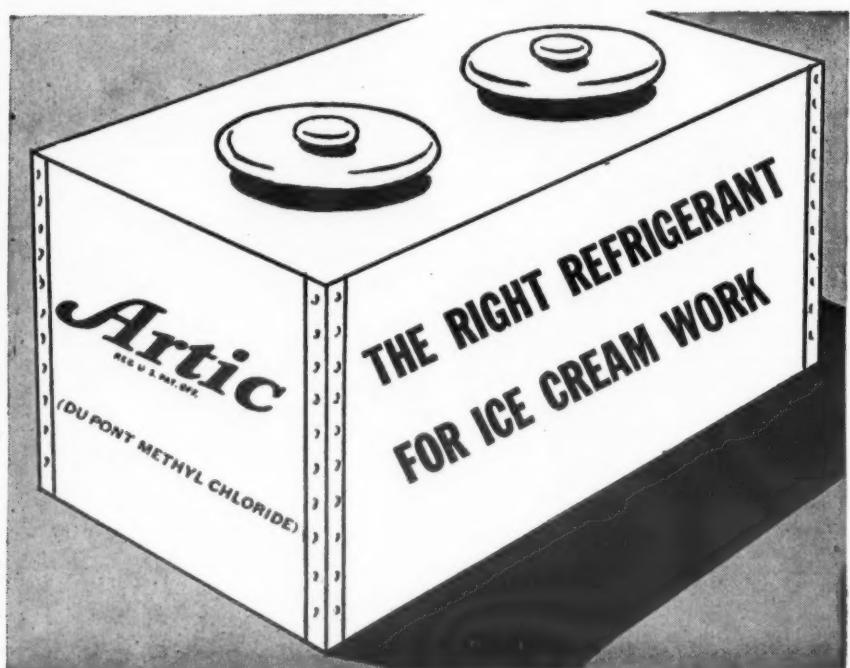
INSULATION REQUIREMENTS

7. All insulation to be enclosed in greaseproof paper.
8. Sound insulating material at least $\frac{1}{2}$ -inch minimum thickness, to be fitted all around machine compartment.
9. Body of cabinet to be in one piece, front and sides, joints to be completely welded, spot welding to be prohibited.
10. Midget models of less than 3 cu. ft.—minimum for household of two persons—to be ignored.

GENERAL OBJECTIVES

General objectives of the Standardization Committee regarding household refrigerators are listed as follows:

- "To protect this desirable electric appliance."
- "To ensure that quality keeps pace with quantity production."
- "To safeguard the interests of the refrigerator purchaser."
- "To ensure long term efficiency after the expiration of 5-year guarantee period."
- "To increase dealer or trader goodwill, through greater user satisfaction."



ITS a quick-cooling refrigerant, permits rapid production of "smooth" ice cream. It gives controlled low temperatures, easily and efficiently, so that ice cream can be held at proper cold before dispensing. That's why it's so widely used in ice cream and dairy cabinets. Recharge these units with the dependable Methyl Chloride—ARTIC—specified and used by leading manufacturers for over 16 years.

Stocked in principal cities in standard containers for prompt de-



E. I. DU PONT DE NEMOURS & COMPANY, INC.
The R. & H. Chemicals Dept., Wilmington, Del.
District Sales Offices: Baltimore, Boston, Charlotte, Chicago, Cleveland, Kansas City, Newark, New York, Philadelphia, Pittsburgh, San Francisco.

ARTIC—The preferred Methyl Chloride for service work

U.S. Units Fairly Strong In Sweden; Conditioning Getting Under Way

Honeywell-Brown, A.B.
Nybrokajen 7
Stockholm, Sweden

Editor:

Many thanks for your letter received some time in March. It was very kind of you to write me as we certainly appreciate letters from home when so far away.

The feud that you mentioned between the Norwegians and Swedes has died out a long time ago and at present they are getting along very nicely. So, I am having no difficulties in that respect.

Your request for a story for AIR CONDITIONING & REFRIGERATION NEWS is a pretty big order and, not being a paper reporter, it is pretty hard for me to outline or give you a verbal picture of the present situation in Sweden as far as air conditioning and refrigeration is concerned.

HIGH LIVING STANDARD

I can tell you briefly that the Swedes' living standard is fully on a par with the American's, and in some cases, might exceed it a little bit. Their apartment buildings are all equipped with built-in refrigeration, naturally most of them Electrolux, but Frigidaire is coming in very strongly. Other American makes are also represented and sold.

As I do not get into the refrigeration end of it very much, at least not the domestic, I am unable to give you any actual figures of how many are sold, but for the size of the country I think the figures would be very substantial and surprising.

AIR CONDITIONING

The disease of air conditioning has reached these shores as well and the consulting engineers who control the design and layout of these jobs are having quite a time getting themselves posted on the subject. There are not very many days in the summer that cooling is required, so consequently, air conditioning is confined to more of a ventilating nature. Mechanical refrigeration of course is rather expensive, but their tap water is plenty cold and comparatively cheap.

This is just about all I can tell you about the industry here with the meager experience that I have had so far and it certainly does not give you very much ammunition for a "hot story" or headline news for your paper.

One gratifying fact is that the Swedes recognize good controls when they see them and our product is highly thought of throughout the various industries. For the convenience of our customers here in Sweden, we now have a Swedish company known as Honeywell-Brown, A. B.

J. J. (JACK) NELSON

Ebeling Is Sales Engineer For F. C. Lovelock

SYDNEY, Australia—Eric Ebeling, one of the foremost refrigeration engineers in Australia, has been appointed sales engineer in charge of the technical department of F. C. Lovelock Pty. Ltd., representative here for several American manufacturers of refrigeration and air-conditioning equipment, Frank E. Hansen, general manager, has announced.

Active in the industry here for almost 20 years, Mr. Ebeling was for a long time connected with Dangar, Gedy, & Malloch, Ltd., Sydney, Kelvinator distributor for New South Wales.

India Railroad May Add More Conditioned Coaches

CALCUTTA, India—Recent introduction of air-conditioned coaches in rail travel between Bombay and Calcutta has proved so popular that authorities are considering a proposal to add three more coaches to the existing number and extend their use to the Bombay-Delhi service and eventually to Kalka, reports the U. S. Trade Commissioner's office.

Cost of air-conditioned coaches is about \$35,000, compared with about \$18,000 for the ordinary first-class coaches.

Australia Removes Import Restrictions On Quantity And Raises Duties On Electrical Appliances

SYDNEY, Australia—Removal of all remaining import restrictions on products so controlled since May, 1935, has been announced by the Australian government.

At the same time, existing import duties were provisionally increased on a selected list of products, including electric refrigerators, motors, washing machines, and electrolytic condensers.

Principal products of interest to American exporters which may now be imported into Australia without limit as to quantity, although still subject to the obtaining of an import permit, comprise electric refriger-

ators, washers, refrigerator parts, radio sets, parts, and tubes, electric motors under 1 hp., vacuum cleaners, lamps, lampware, and lanterns.

This action is in accord with the statement made in the Australian Parliament on Dec. 7, 1937, by the minister for trade and customs, that the import licensing system inaugurated on May 22, 1936, was to be gradually abandoned, and follows the removal of successive lists of articles from the restricted category.

Alterations made in the Australian tariff, affecting electric refrigerators, refrigerator parts, and motors, are as follows:

Item	British Preferential Tariff	General Tariff	Old Rate
Refrigerators and refrigerator parts	55%	...	...
Refrigerators, electric, up to and including 10 cu. ft. gross internal capacity and parts thereof, viz:			
(1) Refrigerators, including mechanical driving units and apparatus for transmitting power to the driven units—each	£5	Specific rates added	
And per cubic foot of gross internal capacity	£2	but ad val.	unchanged
or, alternatively	75%		
(2) Parts (other than parts imported in an unassembled condition) viz:			
(a) Cabinets	£2-2-6	New	
And per each cubic foot of gross internal capacity or alternatively, ad val.	17/-	New	75%
(b) Compressors (not forming part of sealed or semi-sealed refrigerator unit)—			
(1) Single cylinder, each	£1-12-6	New	
or, alternatively, ad val.	75%		
(2) Double cylinder, each	£2-0-0	New	75%
or, alternatively, ad val.			
(c) Evaporators (not forming part of sealed or semi-sealed units) each	£1-0-0	New	
or, alternatively ad val.	75%		
(d) Sealed or semi-sealed refrigerating units including mechanical driving units and apparatus for transmitting power to the driven units each	£8-10-0	New	
or, alternatively, ad val.	75%		
(e) Other ad val.	75%		
(3) Parts imported in an unassembled condition—ad val...	75%	Unchanged	
Refrigerators, electric, exceeding 10 cu. ft. gross internal capacity and parts thereof; refrigerators (other than electric) and parts thereof—ad val.	75%	Unchanged	
(1) Dynamo electric machines, viz:			
Alternating current machines—			
(a) 1 hp. and up to and including 150 hp.—ad val...	30%	65%	Unchanged
Direct current and universal current machines—other			
0.746 kw. and up to and including 20 kw. ad val...	30%	65%	Unchanged
N. E. I., 1 hp. or over	30%	65%	Unchanged
(2) $\frac{1}{2}$ hp. and over but less than 1 hp. each	15/-	New	
and ad val.	30%	65%	Unchanged
(3) Less than $\frac{1}{2}$ hp. ad val.	30%	75%	65%
(4) Parts of dynamo electric machines under 1 hp., when not forming a complete or substantially complete dynamo electric machine	30%	75%	65%
Gas cooking and heating appliances, including gas ranges ad val.	35%	55%	Unchanged
Condensers, viz:			
Electrolytic, each	8d.	New	
or, ad val.	30%	57½%	Unchanged
N. E. I., ad val.	30%	57½%	Unchanged
Java Hotel Gets Units			
Carrier Cools Glass House			
BATAVIA, Java—A Westinghouse beverage cooler and two Westinghouse refrigerators have been installed in the kitchen of the Park Hotel here by N. V. Borneo Sumatra Handel Maatschappij, Westinghouse distributor in the Netherland East Indies.			
LONDON, England—Five Carrier portable air-conditioning units were used to create a comfortable atmosphere in the "House of Glass" exhibit held here recently to promote wider use of glass in home building. Feature of the show was a glass house, completely air conditioned.			
You'll sell more Copelands			
Because they're built right—super-featured for quick sale, super-powered for performance. Because they're priced right—giving you the great advantage of low cost, low down payment, easier terms.			
Write TODAY for facts			
Copeland Refrigeration Corporation			
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ASK ABOUT COPELAND'S COMMERCIAL REFRIGERATION AND COPELAND WATER COOLERS			
AIR CONDITIONING • FITTINGS • REFRIGERATION •			
We manufacture an exceptionally complete line of Valves, Fittings and Accessories for Mechanical Refrigeration and Air Conditioning.			
Send for our new Catalog and Price List 2004—The most comprehensive catalog ever issued to the trade.			
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Locker Storage

Michigan Farmers Are Chief Patrons Of Locker Storage In Converted Depot

By Henry Knowlton, Jr.

CARO, Mich.—Michigan Central railroad trains still stop at Caro, a town of 2,600 people, but the solidly-built railway station—landmark in the town's history—now serves the community as a refrigerated locker storage plant.

Operators of the plant are J. W. and C. T. Symons, of Saginaw, Mich., whose principal business is the distribution of Fairbanks-Morse stokers. The Symons brothers became interested in the locker storage business through reading an article in Time magazine, J. W. Symons said.

Immediately translating interest into action, J. W. Symons acquired the old MC depot at Caro for use as the first unit in the Symons Frozen Food Locker System. The 16-inch brick walls of the building were lined with cork, which has been finished on the inside with cement plaster applied directly on the cork surface. Thickness of the cork varies from 4 inches to 8 inches depending on the requirements.

REFRIGERATION EQUIPMENT

Refrigeration equipment installed in the Caro plant consists of a York 7½-hp. 4 x 4 ammonia refrigeration unit, cooled by water from the Caro city system. One and one quarter inch steel pipe conducts the refrigerant to the chill room, sharp-freeze room, and the locker storage room itself.

Temperatures in the several departments are: chill room, 34° F.; fast freezing room, 10° F.; and 10° F. in the locker storage room.

Lockers used in the plant are built by the Nebraska Appliance Co., Lincoln, Neb., and are known as Lincoln Lockers. They are built in tiers 5-lockers high, and are of perforated steel construction.

Custom butcher in charge of the Caro plant is Dewey Ogden, who reports that 135 lockers have been rented during the two months the plant has been in operation. Provision has been made to accommodate 500 lockers, but only 300 have been installed at the present time.

FARMERS CHIEF USERS

Patronage at this storage plant consists of 70% farmers and 30% townspeople. No charge is made for brokerage of meat, but the processing charge is 1½ cents per pound, which is one-half cent higher than the amount charged in certain other plants. Charge for grinding hamburger is 1 cent per lb., and 2 cents is charged for making sausage, in addition to the processing charge.

According to Mr. Ogden, people in the Caro district do not want "packing house" meat, and will not buy meat having a government stamp on it. For this reason, the storage system caters to the farm trade, and sells the farmers' extra meat to the people from Caro, without a service charge of any kind.

"A farm family will use 1,000 lbs. of meat or more per year, while the city family will not consume anywhere near that much," says Mr. Symons. "It is nothing to see a farmer come into our Caro plant and take home 25 lbs. of meat for a few days' use. Farmers work hard, and for this reason they consume more meat than the people from town."

Approximately 30,000 lbs. of meat have been processed in the Caro plant during the two months it has been in operation, and this is increasing all the time. According to Mr. Symons, the purchase of a quarter of beef, which weighs in the neighborhood of 120 lbs., will pay for the owner's locker for the first year, as he saves at least 10 cents per lb. average on the purchase.

BARGAINING

Mr. Ogden, who deals with the farmers that bring meat to the Caro plant, states that the average farmer demands a good price for the meat he sells to townspeople, and in some cases it is necessary to get the farmer to reduce his "asking price" to effect a sale. For some reason, the

farmer has the idea that he can get more for his meat at the locker plant than at the packing house.

Meat markets in Caro resent the intrusion of locker storage into the community, and now refuse to buy meat from the farmers who have lockers at the plant, Mr. Ogden said.

"There are nine meat blocks in this town of 2,600 people, where three would be enough," Mr. Ogden continued. "For this reason we attempt to dispose of the farmer's extra meat after he has taken a locker with us, and do not charge him for this service."

In the sharp-freeze room at the Caro plant are samples of strawberries, peas, and pineapple, the latter frozen in syrup. These fruits looked as fresh as the day they were picked, and according to Mr. Ogden, they are excellent when used. It is

also possible to quick-freeze green beans and many other fruits and vegetables, with the exception of tomatoes, watermelon, muskmelon, and other items containing a large percentage of water.

Mr. Symons gives the cost of building a locker storage plant of 500-locker capacity approximately as follows:

Land	\$ 1,000
Building	4,000
Insulation	2,600
Ice Machinery	2,900
Lockers at \$4.75 Each	2,385
Meat Blocks and Equipment	1,000
Wiring and Incidentally	500
Total	\$14,385

On the basis of 500 lockers, this total would result in a cost of just under \$30 per locker, the figure used by York Ice Machinery Corp. in estimating the cost of a complete system.

At the present time, the Symons brothers have plans under way for a second locker storage system to be located in another abandoned railway depot in Saginaw. According to Mr. Symons, work on this project will be started immediately and the locker storage system placed in full operation by Aug. 1.

Refrigerating equipment for the Caro plant was purchased from and installed by Westerlin & Campbell, through the York Distributing Co. of Saginaw, which handles York equipment in the territory.

Locker Storage Promoters Advised To Follow Constructive Program To Protect Movement

CHICAGO—Owners must give the proper attention to the proper details in the construction and operation of a refrigerated locker storage plant if the entire movement is to hold up, Robert W. Balderston, vice president, W. E. Guest & Co. (Chicago engineering firm which has made a specialty of designing such plants), told the Agricultural Club of Chicago at one of their meetings here this year.

While the locker storage plant has developed rapidly and has been given much favorable publicity, the publicity has afforded opportunities for irresponsible promoters to profit. Such promoters, interested only in a quick profit, have no interest in a constructive program, Mr. Balderston said, and the history of the locker storage movement might well parallel that of the history of country creameries a generation ago.

At one time more than 900 country creameries were locally promoted and financed in Iowa, Mr. Balderston said. Less than 200 of these are now in existence, the promoters having taken their profit and gone, and the local investors having lost their money.

NECESSARY FACILITIES

Mr. Balderston listed the following facilities as necessary for the success of a locker plant:

1. **A Survey of the Community** to make certain that a sufficient patronage, within the trade radius, can be readily obtained to justify the erection of the plant.

2. **Location of the Plant** should be convenient to the local trade center of the community, but sufficiently removed to permit parking.

3. **Land**: The lot should have good drainage, be convenient to water, electricity, and sewage. Extensive grading is expensive.

4. **Building**: Preferably new, so designed as to have adequate space for work rooms, chilling and freezing facilities, as well as for the lockers themselves, so arranged as to reduce labor to a minimum and to conserve refrigeration as fully as possible.

5. **Insulation**: On walls, floors, and ceilings, adequate for various temperatures, and of such standard insulation material as will remain serviceable for many years.

6. **Refrigeration Equipment**: Sufficient in capacity to maintain proper temperatures under extreme conditions and all loads, with automatic temperature and humidity controls.

7. **Lockers**: Of sufficient weight and strength for the amount of food handled through them and so constructed as to be permanently durable throughout the lifetime of the plant.

8. **Meat Handling and Processing** and **Fruit and Vegetable Processing Equipment**: Sufficient to care for the

proper preparation, freezing, and storage of meat products, such as sausage, lard, and cured meats, to guarantee to the patron a package of standard quality.

9. **Complete Records** in the form of work sheets and bookkeeping records to insure complete control of the plant operations and give a true picture to the management.

10. **Circulars to Patrons and General Publicity Material** are required for proper sales promotion and advertising.

11. **A Fully Trained and Experienced Personnel**.

LOCKERS JUSTIFIED

While there are many pitfalls in the locker plant field, Mr. Balderston nevertheless points out that if locker plants accomplish only two of the possibilities, already established, of giving better food at lower cost and giving better prices to farmers, they justify their existence and growth.

With reference to the savings possible, Mr. Balderston cited an actual case history on the processing of a hog last November taken from the records of the Community Locker Plant in Plymouth, Ind.

This particular hog weighed 225 pounds and was purchased from a farmer for \$8.50 per hundredweight, or \$19.13. The farmer received this full amount without any haulage, yardage, or commission deducted.

Dressed weight of this hog was 163 pounds, and the total retail value at chain store prices was \$40.25. The total butchering, cutting, hickory curing, sausage making, lard rendering, and locker costs were \$5.43, making a total cost of \$24.56, or an average cost of 15 cents per pound, as against an average retail price of 25 cents per pound.

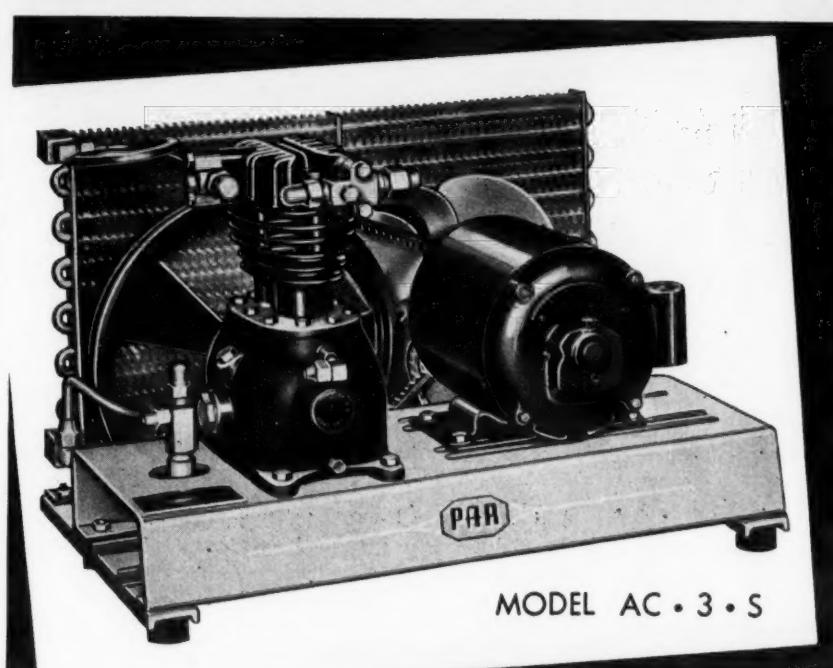
FREEZING FRUITS

With reference to the use of the locker storage plants to freeze and keep fruits and vegetables put up as a frozen pack by the housewife, Mr. Balderston is inclined to agree, in most cases, with a recent bulletin of the University of Minnesota, which declares:

"To anyone who will carefully study all sides of the problem it will be quite clear that the average housewife should not attempt the frozen pack for fruits and vegetables.

"The average household simply is not equipped to prepare a carefully frozen pack product properly. Neither does the average creamery storage house or meat distributor have suitable equipment."

On the other side of this question, Mr. Balderston points out that the Community Locker Plant at Wooster, Ohio, successfully froze several hundred dozen ears of sweet corn and large quantities of peas, beans, and asparagus last year, and that these have been used by the locker patrons all winter.



PAR CLOSE COUPLED CONDENSING UNITS

— are made in three popular sizes, $\frac{1}{4}$, $\frac{1}{3}$, $\frac{1}{2}$ horsepower. Their dimensions make them adaptable to portable ice cream cabinets, self contained food cases, and reach-in coolers. Overall dimensions 24" long, 15" high, 15" wide.

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- ★ Large capacity slow-speed compressors
- ★ Crankshaft driven commercial compressors
- ★ Three-ring pistons—2 compression, 1 oil ring
- ★ Compressor valves in removable valve plate
- ★ Bull's-eye sight oil gauge in crankcase
- ★ Oversize continuous fin, continuous tube condensers
- ★ Fusible plug equipped receivers
- ★ Built-in convenient motor adjustment

There are six compressor bodies and twenty-eight complete high-sides in the Par line, in a range of sizes from $\frac{1}{4}$ to 20 horsepower.



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W. C. DuComb Co., Inc.	Refrigeration Supply Co.	Winterbottom Supply Co.
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Dennis Refrigeration Supply Co.	McKinley Refrigeration Supply	United Electric Serv. Co.
Plint, Michigan	Greensboro, N. Carolina	Toronto, Canada (Ont.)
Shand Radio Specialties	Greensboro, N. Carolina	Railway & Engineering Specialties, Ltd.
Pt. Worth, Texas	Philadelphia, Pa.	Montreal, Quebec, Canada
McKinley Refrigeration Supply	Melchior, Armstrong, Dessau Co.	Railway & Engineering Specialties, Ltd.
Greensboro, N. Carolina	Pittsburgh, Pa.	Winnipeg, Man., Canada
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Stoker Business Forges Ahead

WHEN the refrigeration industry put itself into air conditioning a few years ago, it went for distribution not to its own tried-and-proved dealers and distributors, but to the heating field. Results have been far from happy, especially from the standpoint of sales.

Naturally refrigeration dealers and distributors resented the fact that they were not given an opportunity to help put over this new industry, just as they put over electric refrigeration and are now taking ranges to town. And during the last two years, ironically, they have turned to the heating business.

Refrigeration Dealers Put Space Heaters Over

In the last two seasons refrigeration dealers by the scores have taken over franchises for space heaters and coal stokers, and they have made major industries of both.

Refrigeration manufacturers and distributors are now complaining that they can't divert the attention of many of their best dealers back to refrigeration, so busy are they with the promotion and merchandising of space heaters and stokers.

Rise Of Stoker Industry Phenomenal

Rise of the stoker industry has been little short of phenomenal. While a lot of us have been sitting around wondering what has happened to business, and what is going to happen to take up the slack in unemployment, the stoker industry has been forging right ahead, employing more people each day, and threatening to become one of the major industries of the country.

It has long been recognized that coal, fired by hand, is an inefficient

method of obtaining heat; but due to the relatively low price of coal compared with any other fuel it has, of course, been the major fuel consumed. Therefore, more than 95% of all the heating plants in operation today are coal fired.

Can Be Purchased For 25 Cents a Day

Heating engineers for many years have been developing mechanical means of properly feeding coal to the fire, together with the proper air supply, to give complete combustion of the coal being burned. The result of all this research (which was first conducted to develop industrial coal stokers) is the present day mechanical coal stoker for homes.

When one stops to think that this new type of automatic heat can now be purchased on F.H.A. terms for as low as 25 cents a day, and that, on the average, the owner can expect a saving of as much as 20 cents a day during the six coldest months of the year, it is little wonder that the stoker industry is thriving at a time when business in general has not been encouraging.

15% Return On Cash Investment In Stoker

Stoker salesmen talk to prospects in these terms: The price of a good coal stoker is in the neighborhood of \$275.00. Suppose that you invest \$275.00 in the best available preferred stock or bond. The best possible return on your investment would be 7% annually, or \$19.25. Yet the annual cash savings that can be realized from a coal stoker when properly operated may run as high as \$40 or nearly 15% on the investment. This is to say nothing of the comforts of having the temperature in your home held to within two or three degrees of 72° F. 24 hours a day, regardless of temperature changes outside, and without the necessity of having to run to the basement innumerable times during the day to tend the fire.

Non-Recourse Financing Attracts Dealers

Non-recourse financing of time paper, through the F.H.A., is one of the major appeals to dealers. The dealer can secure his full profit on the sale immediately, and not have to worry about repossession. Another is the low saturation point on stokers—less than 4% of an unusually large market.

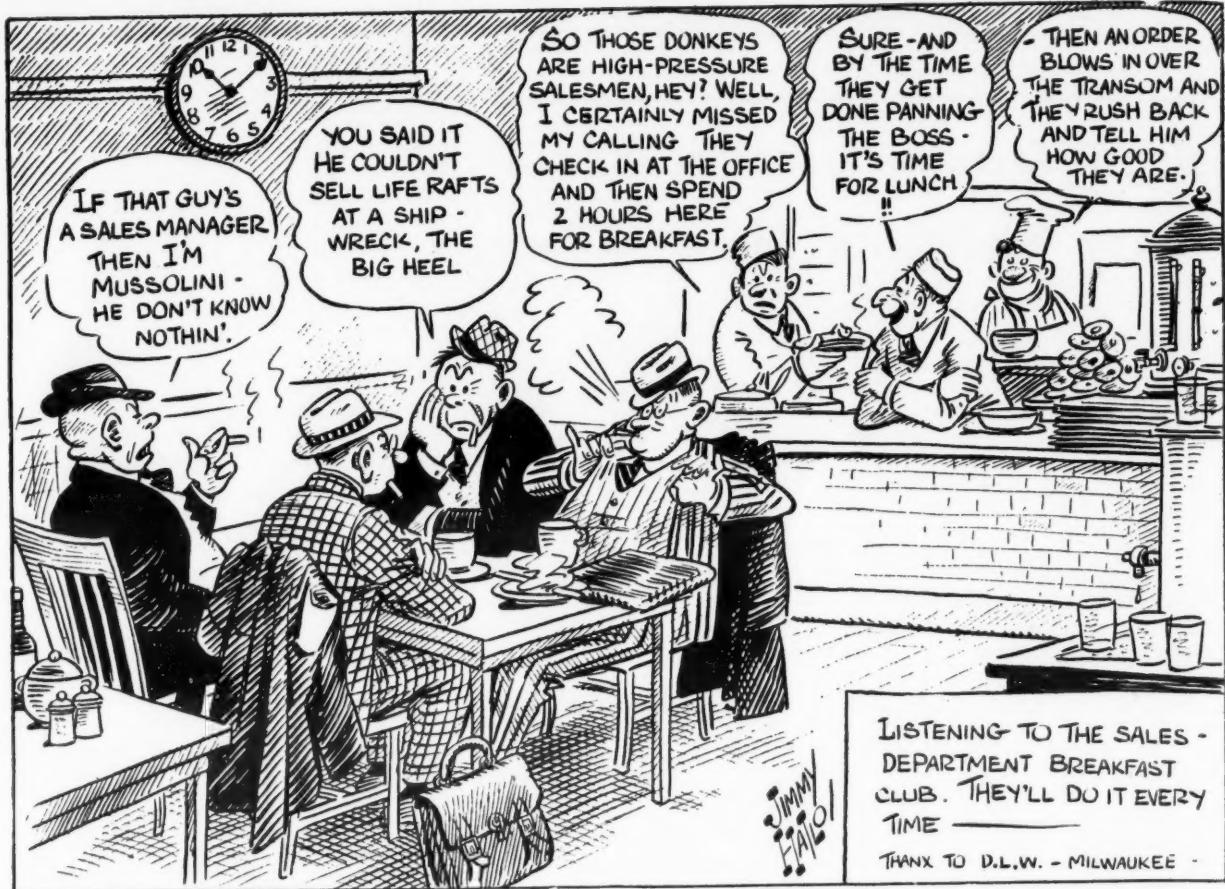
Still another appeal to dealers is the fact that peak selling season on this product runs from Labor Day through November, which is probably the slackest season for refrigeration dealers.

Refrigeration Dealers Now In Heating Business

With stokers and oil burners for furnace users, and with oil-burning space heaters for homes which are not furnace-equipped, refrigeration dealers are going into the heating field with a vengeance.

Air-conditioning manufacturers have objected, when approached by refrigeration dealers seeking franchises, that refrigeration men didn't understand heating problems. It would now appear that such objection is rapidly becoming obsolete.

They'll Do It Every Time . . . by Jimmy Hatlo



News 'Most Necessary' For Dealer's Operation

All Rite Electric
"A Complete Norge Store"
Rushville, Ind.

Sirs:

Inclosed find our check for \$4.00 as a renewal of our year's subscription to REFRIGERATION NEWS.

It seems that a few days ago, we received an offer of one of various manuals published by you, with our renewal subscription, however we have lost the card on which the offer was explained.

If we are correct in assuming that this offer was really made by your good firm, will you kindly send us your new manual of "Appliance Selling Today," and thanks.

In either event, continue our AIR CONDITIONING & REFRIGERATION NEWS, as it is most necessary for our operations.

D. G. VAN OSDEL

Instructors Describe Columbia's Courses

Columbia University
In the City of New York
School of Architecture
June 15, 1938

Editor:

In reply to your letter of April 7, making inquiry concerning our evening courses in air conditioning, may I say that I referred your letter to the two instructors in those courses. It would be more satisfactory, perhaps, to quote directly from their replies, than to attempt to restate their comments.

Mr. Waterfill, the instructor in the elementary course, Air Conditioning 1, replied as follows:

"Regarding Mr. Taubeneck's letter of April 7 to Professor Allen, I submit the following description of the Air-Conditioning course. No doubt this contains considerable repetition of the earlier story printed regarding these courses. Since we are, however, only presenting existing fundamental information to the students and not conducting primary research, we have little to report that is new. For the same reason, I would not consider that the lectures, when published, would have more value than existing published data. The principal value of the lectures in any of these courses is that the material is easier to get across in lectures and discussion form than in the printed form.

"The enrollment in Air Conditioning 1 for both terms of the 1937-1938 school year was 60 students (40 for first term and 20 for second term). The background of experience of the students varies widely—ranging from the youth with a purely academic viewpoint to the seasoned business man, and including men with some technical training and experiences in the air-conditioning field, but many others without concept of heat or mechanics. The aims of these men differ too, but of course not so widely as their experience. Some seek general information and an understanding of the language and standards of air conditioning as an adjunct to related activities, such as architecture, etc. The majority, however, wish to enter, or strengthen their position in the air-conditioning field as salesmen, estimators, servicemen, etc.

"In 1938-1939 the instructors for the two courses will be: Mr. Edwin H. Taze for the elementary course, Air Conditioning 1, and Mr. Albert J. Lawless for the advanced course, Air Conditioning 2. Mr. Taze is connected with the American Blower Corp. in New York City, and Mr. Lawless is a partner of the firm of Hubbard, Richard, and Blakely of New Haven and Boston. As was the case this year, both courses will be offered or repeated in both sessions.

I hope this material will have some news interest, and regret that the instructors have not the time to prepare careful papers on the material of their courses.

GEORGE M. ALLEN,
Executive Officer,
Extension Architecture

"The plan of Air Conditioning 1 is

Air Conditioning

Simple Formula Will Aid Dealers In Designing Ducts & Specifying Sizes

By Henry Knowlton, Jr.

Air-conditioning dealers are often confronted by duct design problems which may be solved by the application of a simple formula, and the use of an easy-to-read table, such as Table 1.

Most large heating and cooling systems are designed by air-conditioning engineers, but if the dealer has no engineer in his own organization, and no outside engineer is available, he may require a ready solution for simple duct design problems.

If the dealer maintains his own sheet metal shop, he will doubtless have a man in his employ who is capable of laying out fan systems that will work right. On the other hand, if he sublets sheet metal work, he may be interested in a means of checking the pipe and duct sizes the independent sheet metal shop proposes to furnish on a given job.

DESIGN FOR BIDS

In other instances the dealer may wish to make his own duct layout, in order that several sheet metal shops can bid on identical specifications, and thus buy his sheet metal to better advantage.

Most air-conditioning engineers use a standard friction chart for laying out duct systems. After the heat loss or heat gain requirements are established in B.t.u. for each room in a given building, the engineer determines the amount of air each room requires, and then, with the aid of a friction chart, arrives at the number of square inches of duct area that will be needed for a given load.

To make this process easier, Table 1 has been worked out to show the pipe sizes necessary to handle given amounts of air, from 40 c.f.m. to 2,000 c.f.m. Round pipe sizes, rectangular trunk lines, and standard wall stack sizes are set up for each quantity of air.

FACTORS IN TABLE

The table has been worked out at .08 inches of static pressure, resistance drop per 100 ft. of ductwork, which represents the resistance encountered in the duct system for residences or small commercial buildings. This resistance factor does not include resistance found in air conditioners, furnaces, filters, or exceptionally long runs.

Figures given in Table 1 are based on a gradual velocity increase in the larger duct sizes. Thus a leader duct, which is capable of handling the sum of the air delivery in wall stacks, does not have to be as large as the combined area of all the wall stacks, as the velocity in the leader duct has been increased. When the leader ducts are combined into the trunk, the velocity in the trunk is again greater.

Care should be taken to select a fan which gives the correct output against the estimated static resistance in the duct system. Certain low quality furnace fans are rated on a free delivery basis only, and cannot be depended upon to operate in a satisfactory manner against the resistance encountered. Fans sold by

reputable manufacturers are all supplied with tables showing their capacity against ordinary duct resistance.

Assuming for the moment that an air-conditioning dealer wants to design a forced-air system for a small residence having a B.t.u. loss of 85,500, the procedure will be as follows: To obtain a register temperature of 135° F. the B.t.u. loss for each room is multiplied by .0145 to obtain the c.f.m. necessary for that room.

If the heat loss on the building is divided as follows, it is then possible to set up the c.f.m. requirements by multiplying each amount by .0145. For purposes of designing a simple cooling system for the same space, multiply the B.t.u. heat gain by .037.

More air is normally necessary to cool an ordinary room than is used for heating purposes. If cooling is contemplated, the system should be designed on the basis of the heat gain for each room, and this figure checked against the heat loss, in each instance using the result which calls for the most air.

Table 1

Data for Round and Rectangular Pipe Sizes Used in Forced Air Heating. Estimated at .08 Static Pressure

C.f.m.	Round			C.f.m.	Rectangular		
	Pipe Size	Rectangular Trunk Line	Stack		Pipe Size	Rectangular Trunk Line	Stack
40	4.7	3x8	10x3	40	4.7	3x8	10x3
45	4.8	3x8	10x3	45	4.8	3x8	10x3
50	5.0	3x8	10x3	50	5.0	3x8	10x3
55	5.1	3x8	10x3	55	5.1	3x8	10x3
60	5.3	4x8	10x3	60	5.3	4x8	10x3
65	5.5	4x8	10x3	65	5.5	4x8	10x3
70	5.7	4x8	10x3	70	5.7	4x8	10x3
75	5.8	4x8	10x3	75	5.8	4x8	10x3
80	6.0	4x8	10x3	80	6.0	4x8	10x3
85	6.1	4x8	10x3	85	6.1	4x8	10x3
90	6.2	4x8	10x3	90	6.2	4x8	10x3
95	6.3	5x8	10x3	95	6.3	5x8	10x3
100	6.4	5x8	12x3	100	6.4	5x8	12x3
110	6.6	5x8	12x3	110	6.6	5x8	12x3
120	6.9	5x8	12x3	120	6.9	5x8	12x3
130	7.2	6x8	14x3	130	7.2	6x8	14x3
140	7.3	6x8	14x3	140	7.3	6x8	14x3
150	7.5	6x8	14x3	150	7.5	6x8	14x3
160	7.7	6x8	14x3	160	7.7	6x8	14x3
170	7.9	7x8	2-10x3	170	7.9	7x8	2-10x3
180	8.0	7x8	2-12x3	180	8.0	7x8	2-12x3
190	8.2	7x8	2-12x3	190	8.2	7x8	2-12x3
200	8.4	8x8	2-12x3	200	8.4	8x8	2-12x3
210	8.5	8x8	2-12x3	210	8.5	8x8	2-12x3
220	8.7	8x8	2-12x3	220	8.7	8x8	2-12x3
230	8.8	8x8	2-12x3	230	8.8	8x8	2-12x3
240	9.0	9x8	2-12x3	240	9.0	9x8	2-12x3
250	9.1	9x8	2-14x3	250	9.1	9x8	2-14x3
260	9.3	9x8	2-14x3	260	9.3	9x8	2-14x3
270	9.4	9x8	2-14x3	270	9.4	9x8	2-14x3
280	9.5	10x8	2-14x3	280	9.5	10x8	2-14x3
290	9.6	10x8	2-14x3	290	9.6	10x8	2-14x3
300	9.7	10x8	2-14x3	300	9.7	10x8	2-14x3
320	9.9	10x8	3-12x3	320	9.9	10x8	3-12x3
340	10.1	11x8	3-12x3	340	10.1	11x8	3-12x3
360	10.4	12x8	3-12x3	360	10.4	12x8	3-12x3
380	10.7	12x8	3-12x3	380	10.7	12x8	3-12x3
400	10.8	12x8	3-14x3	400	10.8	12x8	3-14x3
420	11.0	13x8	3-14x3	420	11.0	13x8	3-14x3
440	11.3	13x8	3-14x3	440	11.3	13x8	3-14x3
575	12.4	16x8	4-14x3	575	12.4	16x8	4-14x3
600	12.6	17x8	4-14x3	600	12.6	17x8	4-14x3
625	12.8	18x8	4-14x3	625	12.8	18x8	4-14x3
650	13.0	18x8	4-14x3	650	13.0	18x8	4-14x3
675	13.2	19x8	5-14x3	675	13.2	19x8	5-14x3
700	13.3	19x8	5-14x3	700	13.3	19x8	5-14x3
725	13.6	20x8	5-14x3	725	13.6	20x8	5-14x3
750	13.7	20x8	5-14x3	750	13.7	20x8	5-14x3
775	13.9	21x8	5-14x3	775	13.9	21x8	5-14x3
800	14.0	21x8	5-14x3	800	14.0	21x8	5-14x3
825	14.2	22x8	6-14x3	825	14.2	22x8	6-14x3
850	14.3	22x8	6-14x3	850	14.3	22x8	6-14x3
875	14.6	23x8	6-14x3	875	14.6	23x8	6-14x3
900	14.7	24x8	6-14x3	900	14.7	24x8	6-14x3
925	14.8	24x8	6-14x3	925	14.8	24x8	6-14x3
950	14.9	24x8	.....	950	14.9	24x8	.....
975	15.0	25x8	.....	975	15.0	25x8	.....
1,000	15.2	25x8	.....	1,000	15.2	25x8	.....
1,100	15.7	27x8	.....	1,100	15.7	27x8	.....
1,200	16.2	29x8	.....	1,200	16.2	29x8	.....
1,300	16.7	31x8	.....	1,300	16.7	31x8	.....
1,400	17.3	34x8	.....	1,400	17.3	34x8	.....
1,500	17.7	36x8	.....	1,500	17.7	36x8	.....
1,600	18.2	39x10	.....	1,600	18.2	39x10	.....
1,700	18.4	30x10	.....	1,700	18.4	30x10	.....
1,800	19.0	32x10	.....	1,800	19.0	32x10	.....
1,900	19.4	33x10	.....	1,900	19.4	33x10	.....
2,000	19.8	35x10	.....	2,000	19.8	35x10	.....

When the kitchen, bath, and hall are shut off in the average residence, during the cooling season, the balance of the system must handle more air from the fan. For this reason, the duct system should be designed to have enough capacity to prevent air noise in the stacks and registers due to an increase in velocities. In certain cases, experienced engineers will add an extra stack and register to the living room and large bedrooms, to handle any additional air necessary for cooling the room.

ESTIMATING COOLING

In the example given below, the .0145 factor is used and computations are based on heating requirements only. For estimating a cooling system on the building must be set forth, and the c.f.m. requirements determined from that. If the specifications call for cooling one or more rooms of the building, multiply the heat gain by .037 to determine the c.f.m. necessary for each room to be cooled.

The following tabulation is based on heat loss requirements and the c.f.m. necessary to handle this load.

Room	B.t.u.	C.f.m.
Living Room	18,000	261
Dining Room	9,000	130
Kitchen	8,500	123
Hall	6	

Air Conditioning

Interior Designers Study Conditioning At National Conference Of Engineers & Manufacturers

NEW YORK CITY—First national educational conference ever held on the relationship between air conditioning and interior design was held here June 7 and 8. The conference was attended by interior designers, architects, engineers, and air-conditioning equipment manufacturers.

Speaking before the conference, Harry V. Anderson, publisher of *Interior Design and Decoration* magazine, under whose auspices the meeting was held, stated that "professional designers of interiors for such structures as residences, hotels, clubs, offices, apartment houses, restaurants, specialty shops, and home furnishing show rooms are seeking full knowledge of air conditioning as a new element in their service."

CABINET DESIGN

Designers who expressed the fear that room-unit cabinets might go the way of radio cabinet design were reassured by Charles S. Leopold, Philadelphia air-conditioning engineer, who told them that today's units show great advance over cabinet appearance of a few years ago.

"Moreover, their interiors reveal great ingenuity in adapting involved equipment to relatively small space," he said. "Today's cabinets were produced for a mass market that actually has not yet materialized. When production increases, you can expect further evolution and perfecting of appearance."

Mass production eventually may reduce the price of room units, but it is not likely that appreciable change will come in the case of the large "tailor-made" installations, he declared.

RADIATORS DISAPPEAR

Old-fashioned cast-iron radiators for Louis Quinze interiors have vanished with all other old utilitarian bugbears before the spread of air-conditioning's weather control features, Lurelle Guild, New York City industrial designer, asserted.

"Comfort and health reasons obviously are of greatest importance in convincing our clients that they should adopt air conditioning," said William A. Kimbel, president of A. Kimbel & Son, Inc., New York City interior designers.

"Moreover, for those clients having valuable paintings, antique furniture, beautiful rugs, and other fine furnishings, there is much to be said for air conditioning in that it preserves the quality of such fittings and greatly prolongs their life."

Necessity for selling the woman, as well as the man, in the case of

home air conditioning, was revealed in the course of a talk by Ralph Walker, of Voorhees, Gmelin and Walker, New York City architects.

"Recently I overheard a man whose job it was to sell air conditioning explaining what he did and the difficulties he encountered," he said. "The salesman told me it was perfectly easy to interest the man of the family in the idea of air conditioning, both from what it would do and for its mechanical interest, but the sale went aground as soon as the wife learned the added cost. For she generally was a real economist and judged that cost and results against other things."

"For years we have had Pure Food Laws and meticulous inspection of milk and water supplies, and the results of these practices have produced a great reduction of epidemic diseases and untold benefit to our general nutrition," said Dr. Albert G. Young, Brookline, Mass., who is conducting exhaustive studies in the air-conditioned Corey Hill hospital, of which he is director. "Is it not reasonable then to expect that an equal amount of attention given to the air we breathe would produce the same dividends in our national health?"

"It is my belief that every city apartment house, hotel, school, and office will eventually be air conditioned and the expense of installation will be repaid many times over in health."

Air conditioning and noise abatement does not mean a more artificial method of living. It is an attempt to counteract some of the artificial conditions which now exist in urban centers."

Dr. McConnell Appointed To Cooling Committee

NEW YORK CITY—Dr. William J. McConnell, assistant medical director of the Metropolitan Life Insurance Co., has been appointed to the technical advisory committee on "Air Conditioning in Industry" of American Society of Heating & Ventilating Engineers, announces W. L. Fleisher, chairman of the committee on research.

The industry committee, headed by A. E. Stacey, Jr., and comprising a group of experts in industrial hygiene, is studying the effects of air conditioning on the health of workers in factories requiring high temperatures and high humidities for the proper manufacturing of their particular products.

The ever increasing demand for Sporlan Valves on all types of refrigeration and air conditioning applications conclusively proves that the unequalled performance of Sporlan Valves counts most with Engineers.

That is why everyone says:
"YOU CAN INSTALL
SPORLAN VALVES
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Join the big swing to Sporlan and take advantage of this extra "performance value" at no extra cost.

SPORLAN THERMOSTATIC EXPANSION VALVES
SPOEHRER-LANGE CO.
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New York Lipman Branch In New Offices



Left: H. A. Sheehan, branch manager of New York Lipman Corp., points to models of the 20, 25, and 30-hp. Freon machines manufactured by General Refrigeration Corp. Center: General view of the branch's new offices, which provide much additional office and display space. Right: H. J. Schwartau, branch service manager, with one of GR's model F-216 unit coolers.

Air Conditioning In Bakery Checks Loss of Weight, Speeds Bread Cooling & Improves Products

MONROE, La.—By preventing the formation of crust on dough, speeding up the cooling of bread, eliminating cracking and mold, checking loss of weight, and in other ways improving the quality of the product, an air-conditioning system has materially increased profits of Ouachita Baking Co. here, according to G. B. Watkins, general manager.

Installed by Jack C. Hildebrandt of Lake Charles, La., the system includes a Fedders 3-ton unit for the dough room, a 5-ton unit for the bread-cooling room, and the required ductwork, thermostats, humidistats, and humidifier.

Both compressors are equipped with spray nozzles which produce a thick fog of moisture to maintain correct relative humidity. All air is recirculated, and the humidifier is controlled by a humidistat in the room being cooled.

Correct dry-bulb temperature is maintained through the use of thermostats in the two rooms. A heating coil is to be added to the 3-ton conditioner for the winter.

Ductwork was designed to give even distribution to all parts of the rooms without using high-velocity discharge grilles.

By holding the dough room at 80° F. (dry bulb) with 80% relative humidity, the air-conditioning system

has reduced weight losses due to evaporation by about 12 lbs. per three-barrel mix, T. D. Tillman, shop superintendent, reported.

Without proper air conditions, Mr. Tillman said, there is a loss of 10 to 15 lbs. per barrel of mix through evaporation. This is in addition to an uncontrollable weight loss of 4 to 5 lbs. per barrel caused by chemical changes.

Another improvement conditioning brings about in the dough room is the elimination of crust on the dough by maintaining the high humidity. Dry atmosphere causes a crust to form over the dough which cannot be dissolved in the mixer, Mr. Tillman explained.

In the bread-cooling room, Mr. Tillman stated, the air conditioning has reduced cooling time of 1,500 loaves from three hours to 30 minutes. Temperature of the bread is reduced from 425 to 80° F.

Cracking and mold in the bread has been eliminated, and weight and flavor maintained 100% due to fast cooling, Mr. Tillman continued.

Previous to the installation, he pointed out, it took 18 oz. of dough to make a 1-lb. loaf of bread. Now it takes 17½ oz. Average daily production is 6,000 loaves, so that the daily saving of dough is nearly 190 lbs.

Funeral Home Equipment Requires Excavation

ERIE, Pa.—Faced with the problem of finding room to install the central equipment used in air conditioning the Donald C. Burton funeral home here, engineers had to break through the front wall of the basement and excavate a special chamber under the front porch.

Lack of space in the basement precluded installation of the equipment there, and the upstairs rooms were too much in demand for any one of them to be given over to the equipment. Another deterring factor was that ductwork along the basement ceiling would leave too little head room.

So the soundproof chamber, "insulated by nature," was dug under the porch, and ducts were run up to and along the first floor ceilings, being concealed as a cornice. The Carrier "Weathermaker" and compressor air condition the work rooms and chapel.

Conditioning Increases Candy Production

CHICAGO—Greatly increased production in the caramel department of Nutrine Candy Co. since the installation of air-conditioning equipment is reported by N. V. Diller.

Before the installation, Mr. Diller declared, production was almost at a standstill on hot summer days, and the heat and humidity affected the caramel material.

Mr. Diller also reported a 50% increase in production of chocolate dipping of cream and cherry centers, due mainly to rapid cooling and setting of the centers by the air conditioning.

Equipment consists of a Carrier special spray type dehumidifier and a direct-expansion coil to supply cooling effect to air for revolving pans in the chocolate pan room. Constant temperature of 75° F. with 40% relative humidity is maintained in the caramel wrapping and cutting room, chocolate pan room, and centers cooling room. Chocolate pans themselves are cooled to 45° F. with relative humidity of 60%.

New York Lipman Corp. Gets Larger Quarters

NEW YORK CITY—Local office of the New York Lipman Corp., a subsidiary of General Refrigeration Corp., Beloit, Wis., has been moved from 510 to 639 Grand Central Palace, to handle increased volume of both commercial refrigeration and air-conditioning equipment.

Larger quarters in the new location permit the permanent display of a wide variety of commercial refrigeration and air-conditioning equipment in the office itself, and considerable additional space also is available for shop and storage purposes.

H. A. Sheehan, branch manager of New York Lipman Corp., is in charge of the new office. H. J. Schwartau is service manager of the branch.

New York Trade School Plans Specify Cooling

NEW YORK CITY—Completed last week, plans for a new Central high school for needle trades submitted to the board of education reveal it will be the first public school building in New York City to be both air conditioned and sound proofed.

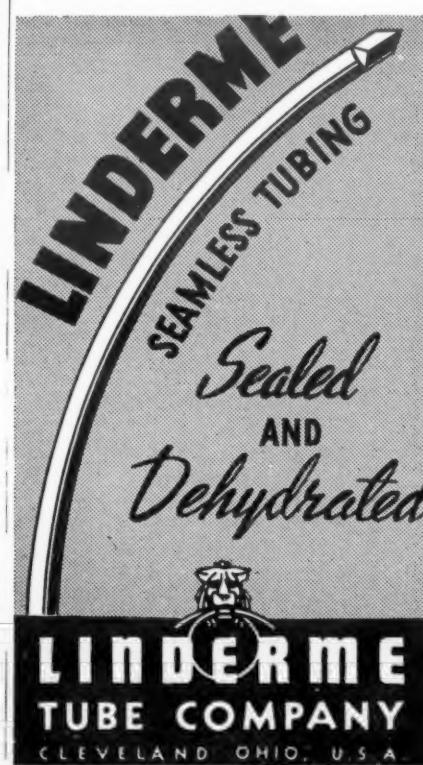
The school will be air conditioned to counteract the heat generated by pressing and dyeing equipment, explained Morris E. Siegel, director of vocational schools. The rooms are intended for use during the summer months. Sound proofing is necessary to dull the noise of sewing and cutting machinery.

The building will house 3,060 students, the approximate number now enrolled in the three separate needle trades high school buildings now used in Manhattan, which will be closed when the new building is completed.

Estimated cost of structure is \$1,600,000. Contracts totaling \$426,000 for excavation, foundations, and structural steel work have been let, and erection of the steel skeleton is expected to start in a week. An additional \$1,300,000 will be expended for furniture and equipment.

Hotel Coffee Shop Cooled

LONDON, Ont., Can.—Remodeling of the enlarged coffee shop of the Hotel London here, included the installation of a Kelvinator air-conditioning system. Commercial refrigeration equipment for the hotel was also supplied by Kelvinator.



A LARGE VARIETY OF CYLINDER SIZES INDIVIDUALLY ANALYZED AND TAGGED

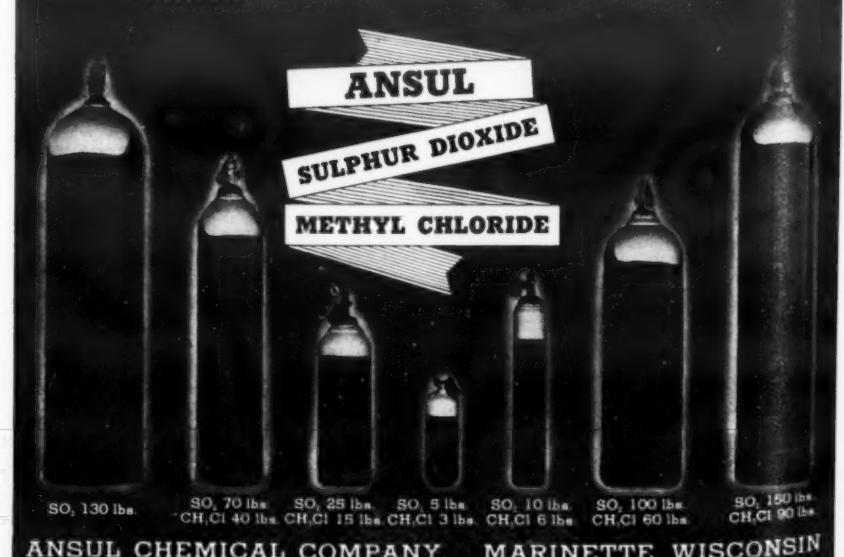


Fig. 1—The
crankcase
the other
effective

Engineering

Problems Of Compressor Lubrication & Factors In Producing and Testing Oil Are Discussed By Brewer

Mr. Brewer has been making a comprehensive study of the subject of refrigerating machine lubrication for the past several years; some of his earlier reports were also published in the News.

In this article he discusses some of the problems of compressor lubrication, the characteristics of oil now considered most suitable for such work, and the methods used in lubricating the various compressor parts.

This article will appear in the July issue of "Lubrication," a technical publication put out by the Texas Co. devoted to the selection and use of lubricants in various industrial fields.

By A. F. Brewer, Mechanical Engineer, The Texas Co.

A VARIETY of chemicals adapted to refrigeration purposes have been popularized by the development of the air-conditioning or comfort cooling industry and its counterpart—electric refrigeration. Some are practically inert; others in turn are miscible with petroleum lubricating oils; while still others seem to have little or no tendency towards reaction or solution with the latter.

We were dealing with this third classification when ammonia and carbon dioxide were the predominating refrigerants. Later as sulphur dioxide was applied to lower pressure units, the possibility of chemical reaction had to be anticipated, especially in the presence of moisture; this imposed the requirement of high dielectric strength in the lubricating oil, a feature which has come to be regarded as one of the most important characteristics today.

Most recently has the industry had to consider the viscosity-reducing effects of the chlorinated and fluorinated refrigerants, such as Carrene, methyl chloride, and the Freon group.

All this has imposed a most exacting obligation upon the petroleum industry, to develop a type of lubricating oil which will resist these changes as much as possible. It has required intensive research, and most precise methods of refinement.

When it first became incumbent upon the oil industry to investigate the manufacture of lubricating oils for this type of refrigeration, the pour test was regarded as the salient characteristic, and refinery procedure was patterned accordingly. Later, it was developed that chemical stability, as measured by resistance to oxidation, required even more careful consideration.

So this became the primary objective in the manufacture of such oils; the several physical characteristics such as viscosity range, moisture content, pour and flash points are regarded chiefly as control factors to be developed in the course of refine-

ment according to specific requirements of the machinery builders.

All this has required that most careful consideration be given to refinery methods which would assure of maximum removal of unsaturated hydrocarbons, which latter have been proved to be most susceptible to chemical breakdown.

The Detriments Of Water

At the same time it has been found necessary to take the utmost precautions to keep such oils free from moisture, as this latter, when the oil comes in contact with certain types of refrigerants, accelerates corrosion, to promote the formation of detrimental deposits or, even to enter directly into chemical reaction under certain conditions of pressure and temperature.

Hence the adoption of a drastic dielectric strength requirement as part of the usual purchasing specification for refrigeration oils. An appreciable amount of water in any such system might also cause stoppage of the expansion valve due to freezing; ice formations in the cooling coils would also be a possibility, an occurrence which would reduce evaporative efficiency.

To offset the above where water cannot be entirely removed, some builders have added a small amount of alcohol as an anti-freeze, using the anhydrous methyl variety.

Alcohol, however, can best be regarded as a remedy, not a cure. Furthermore, most alcohols are not anhydrous, so careless action on the part of a service man may lead to introduction of sufficient water with the alcohol to subsequently cause serious deposits to develop.

The presence of alcohol, even in its purest form, is also claimed to be objectionable, as it adds another chemical to the already complex assortment which is presented by the refrigerant, the lubricating oil and the usual metals employed in the system.

Moisture in refrigerating compres-

sor service will be most likely to cause corrosion when sulphur dioxide is being used. Sludge or objectionable deposits will in turn be experienced with methyl chloride, Carrene, and the Freon group.

The initial charges of refrigerant and oil therefore must be virtually water-free, and care must be taken to prevent the occurrence of leaks which might lead to entry of moisture-laden air and subsequent condensation of moisture. All this, of course, becomes a function of the manufacturer in the original design and construction of the unit, and the service man in its maintenance.

In turn, it becomes the function of the manufacturers of the refrigerant and lubricating oil to prepare their products so that these will also be quite dry.

Dielectric Strength

Moisture content in petroleum lubricating fractions became of consequence with the development of the electric transformer, and the use of light viscosity lubricating oils for insulating and cooling purposes. Obviously, such oils had to show maximum insulating qualities; water would reduce these materially.

The test developed was of an electrical nature. It determined the absence of water by the resistance offered to passage of electric current. Petroleum oils are excellent non-conductors of electricity when virtually free from entrained moisture; under such conditions but a negligible amount of current can pass.

So the test procedure involves subjecting the oil under consideration to high voltage in a standardized test cup fitted with fixed gap electrodes of copper or brass. Resistance of oils to a stress of at least 21,000 volts per millimeter was found to be an indication that they were sufficiently dry for transformer purposes.

With the advent of methods of refrigeration requiring oils of like dryness, obviously this test for dielectric strength became of equal value to the petroleum chemist in refining and treating his lubricants for compressor service. Minute traces of moisture or solid materials have a very definite effect on reducing the dielectric value of an oil.

In refinery procedure, concluded by filtration, the presence of any of these materials is completely eliminated. A variety of materials can be used for filtration. Filter press methods have proved to be most dependable, using a special grade of filterpaper for moisture absorption.

Care In Handling Lubricating Oil

Petroleum oils which have been actively dehydrated will tend to reabsorb a certain amount of moisture when exposed to the air for any length of time. This will result in reduction of their dielectric strength, dependent upon the relative humidity of the air, the temperature range

Vilter Force-Feed Oiling System

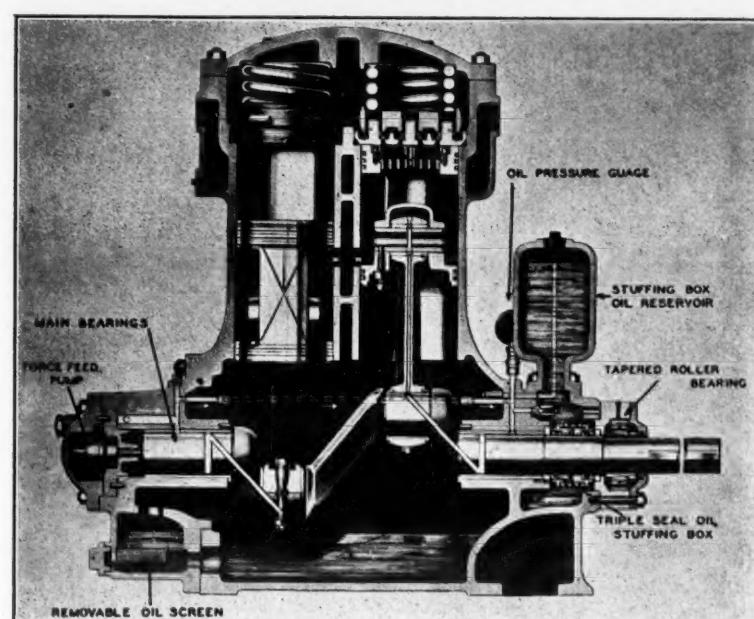


Fig. 2—Cross section of a Vilter "Freon" compressor showing the force-feed oiling system and triple-seal. Vilter uses an automatic reversible gear-type oil pump, as indicated, and a specially designed method of sealing the stuffing box by oil-flooding. This provides the necessary seal, protects the metallic surfaces, and prevents gas leakage.

and the length of time they have been so exposed.

They should therefore be carefully stored and the containers opened only when it is necessary to use the oil; subsequently, if any oil remains unused the containers should be sealed as tightly as possible using special air-tight replaceable tops when cans are involved, or sealing gaskets on metal drums.

Before usage it is always advisable to keep containers of oil at room temperature, or the temperature of handling, for at least 24 hours. This will assure of an equalized temperature, and will reduce the possibility of moisture condensation in the oil and impairment of the dielectric strength.

It is always perfectly feasible to bring back the dielectric strength by refiltration through specially dried blotting paper, but this is a costly procedure which careful handling of the oils should render unnecessary.

Pour Test Control

The pour point of a petroleum oil is the lowest temperature at which it will pour or flow when chilled without disturbance under definite prescribed conditions.

This test is, therefore, of prime importance in the consideration of a refrigerator oil. It is usually associated with the wax content and viscosity of the oil. In other words, as these increase they will materially affect the pour test. Some heavy lubricants for example may have a pour test as high as normal room temperature. Here the recorded pour test may be due to both the wax content and the viscosity or the viscosity alone; in the case of the latter we have the term "viscosity pour."

This is especially true with oils derived from naphthenic base crudes, which naturally contain a minimum amount of wax. With modern methods of refining it is possible to overcome this obstacle, to a great extent, by employing some one of the modern solvent refining processes.

The sequence of manufacture is of distinct interest and exceedingly important. After careful segregation of the crude to balance the relative value of its other characteristics against the benefits of low pour test, it is run to produce a lubricating fraction.

This lubricating fraction, which is normally a distillate in the case of refrigerator oils, is then subjected to intensive chemical treatment and filtration. The cost factor has dictated that refrigerating oils are refined most economically from naphthenic base crudes, although recent

(Continued on Page 14, Column 1)

Anaconda Copper Refrigeration Tubes

Dependable!



THE AMERICAN BRASS CO.
FRENCH SMALL TUBE BRANCH
General Office: Waterbury, Conn.

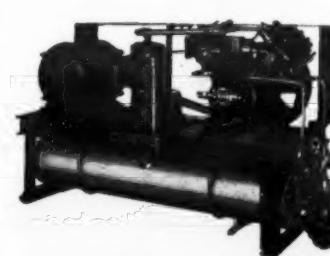
Another Example of CURTIS' Advanced Engineering Features

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Such engineering refinements and attention to details have made possible the Curtis record of trouble-free, efficient and economical performance—proven year after year in thousands of installations. There's a Curtis compressor and condensing unit for every requirement, from 1/6 h. p. to 30 h. p.

Write to Curtis today for complete information.



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"Builders of Condensing Units Since 1922"

—for every air conditioning and refrigeration requirement.

7-Cylinder Airtemp Unit

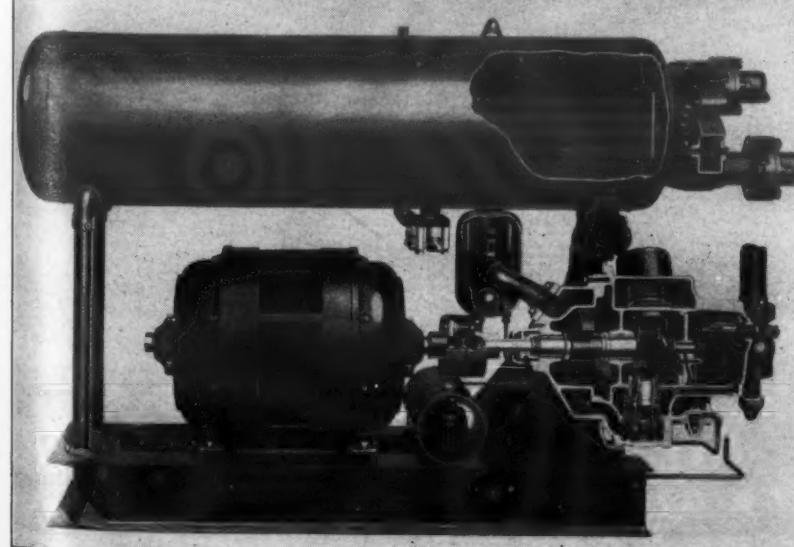


Fig. 1—The Airtemp 7-cylinder air-conditioning unit provides for a dry crankcase using two oil pumps; one for delivery of oil under pressure, the other for scavenging the crankcase. Airtemp also provides an effective oil separator, and an auxiliary oil storage tank adjacent to the crankcase to which all return oil is drained.

CURTIS REFRIGERATING MACHINE CO.
Division of Curtis Manufacturing Co.
1912 KIENLEN AVENUE

ST. LOUIS, MO.

Light Viscosity Of Oil and Refrigerant Mixtures Can Afford Adequate Lubrication, Tests Show

(Continued from Page 13, Column 5) developments in solvent dewaxing refining have indicated the practicability of starting with a paraffin base crude and arriving at similar objectives by using various combinations of refining and dewaxing; manufacturing costs, however, may be increased.

Flash Point

While the average air-conditioning or refrigeration compressor will function at maximum temperatures considerably below 200° F., there will be times when an installation of the booster type may approach 300° F., on the discharge side.

For this reason the flash point as an indication of the relative vaporizing tendency of petroleum lubricating oil must be given consideration. Fortunately, the flash point of even

the lower viscosity oils will be sufficiently above 350° F., to preclude any abnormal vaporization and thickening of the oil.

A further indication of the degree of refinement is the extremely low tendency to form carbon residue on heating which will be shown by such oils.

Viscosity—Reduction

The tendency which mineral oils will have to mix or go into solution with the chlorinated or fluorinated refrigerants has fostered a decided interest in the subsequent viscosity of the mixtures.

In the beginning it led to consideration of oils of somewhat heavier original viscosity than subsequent experience proved were necessary. The fact that a 300 viscosity oil would be reduced to an operating viscosity range of, let us say, 90 seconds Saybolt Universal at 100° F., by admixture with 10% of Freon or methyl chloride, caused the skeptics to wonder as to the lubricating value of the mixture. Still doubting, they raised the original viscosity of their oil to be on the safe side, in an effort to keep their operating viscosity at least 100 seconds at 100° F.

Others, more willing to investigate the lubricating value of lower viscosity oil-refrigerant mixtures, carried out exhaustive laboratory and service tests. The resultant performance of the lighter viscosity refrigerating oils within say a range of 150 to 300 seconds Saybolt Universal at 100° F., has been convincing.

just as smaller amounts will be absorbed at lower pressures and higher temperatures.

Type Of Compressor a Factor

The amount of compressor oil which may come into contact with the refrigerant in any such system will depend upon the type of compressor, and the method of sealing. The centrifugal machine presents a comparatively simple problem involving the lubrication of ring-oiled bearings and the maintenance of a seal against loss of vacuum.

Normally, a certain amount of leakage of the refrigerant, which may be any one of the chlorinated or fluorinated materials, will occur; it will not be sufficiently extensive, however, to give any concern as to the resultant lubricating ability of an oil which has been specifically refined for this class of service, as the refrigerant content will usually be below 10%.

Reciprocating compressors, however, require consideration of the method of lubrication. Small torque units designed for splash lubrication, as are so many of the vertical unit type railway or household machines, depend upon oil throw from the crank to splash the necessary amount of oil to the cylinders.

Some of this oil is bound to pass over to the high-pressure side and become mixed with the refrigerant. For this reason there is provision for return directly to the crankcase.

In such machines an oil level regulating device is therefore frequently installed, although if care is observed not to charge the compressor with too much oil to begin with, oil level regulation may not be necessary; it is, therefore, not always used on the small unit type of machine. The trend, however, is toward

Sectional View Of Crosley Compressor

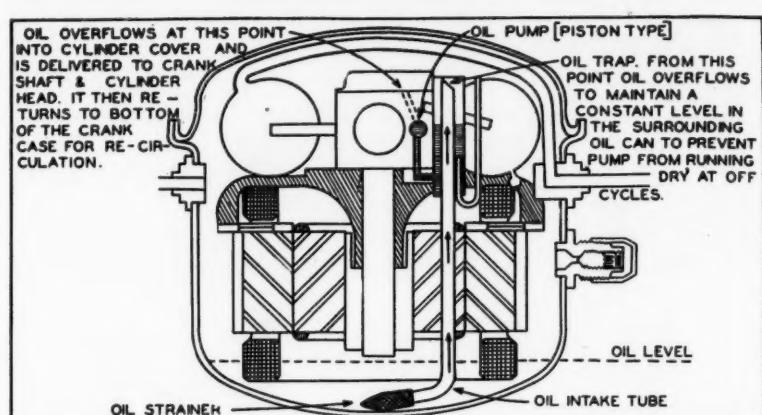


Fig. 4—Sectional details of the Crosley compressor. The lubricating system designed by Crosley is most positive and dependable in its assurance of protection of the compressor parts; it also assures against the pump running dry.

ture with the refrigerant is further reduced by using the cross head type of vertical compressor as well as the horizontal double-seal stuffing box machine. In these units the refrigerant vapors are kept entirely clear of the base or crankcase of the machine; being returned directly to the cylinder block. As a result there is but little chance of the oil in the case becoming mixed with refrigerant, so here again foaming is eliminated along with reduction in viscosity.

Since lubrication of the crankcase elements or external parts is maintained entirely independent from the cylinders, it is customary to provide for injection of a certain amount of oil into the refrigerant return line or directly to the cylinder and stuffing boxes to take care of piston and valve lubrication and protection of the cylinder walls against scoring. This oil can be subsequently separated from the refrigerant by judicious installation of the oil separator.

Function Of the Oil Separator

This element as its name implies serves to remove entrained oil from the refrigerant. It proved its value very early in the development of the refrigerating industry as a means of improving the efficiency of ammonia and carbon dioxide in ice making and cold storage machines. Later, with the acceptance of the chlorinated or

fluorinated refrigerants and their susceptibility to direct mixture with petroleum lubricating oils, the oil separator again came to be depended upon, especially in larger installations; here it served an added purpose, as an assistant to maintenance of the oil viscosity.

The separator, therefore, is of value wherever an excess of oil might otherwise find its way to the evaporating or cooling side of a refrigerating system. Such a device is most effective where it is capable of removing particles of oil from the refrigerant while the latter is in gaseous form, after it has left the compressor.

The larger the oil particles, of course, the more effective will be the separator. It should, therefore, be located at a sufficient distance away from the compressor to permit of adequate precipitation of the oil from within the refrigerant.

The capacity of any separator should be ample so that the velocity of the gas passing through will not be too high. But we must realize that should an excessive amount of oil be fed to the compressor, a heavy load will be imposed upon the oil separator.

Location Affects Separation

The manner of location of such a device is very important. In general, (Continued on Page 15, Column 1)

Westinghouse Unit With Oil Pump

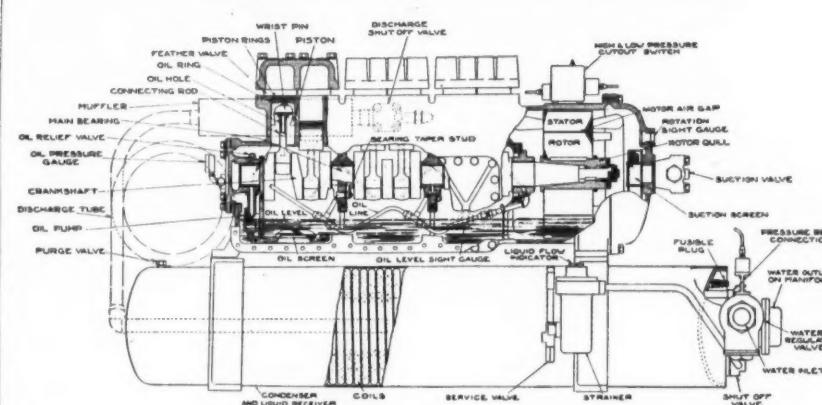


Fig. 3—Internal construction of the Westinghouse type CIS-850 condensing unit. The oil pump is mounted on the end bearing opposite the motor end of the compressor. Via drilled crankshaft and connecting rods, full pressure lubrication is developed throughout the machine.

It was definitely indicated that they were capable of affording entirely dependable lubrication even though the viscosity of the lubricating film was materially reduced by the refrigerant. This has justified the use of such oils by a number of builders who even go so far as to apply the same oil to both Freon and sulphur dioxide units.

Control Of Refrigerant Vapors

Compressors of the reciprocating type can also be built so that the refrigerant vapors are kept entirely apart from the crankcase. Construction of this nature largely eliminates the possibility of the oil becoming mixed with an excess of refrigerant.

This enables the oil to maintain its original viscosity, or merely to follow the normal reduction in viscosity which would take place as the crankcase comes up to average operating temperature. This condition will prevail in the enclosed crankcase machine equipped with trunk-type pistons and designed for pressure lubrication.

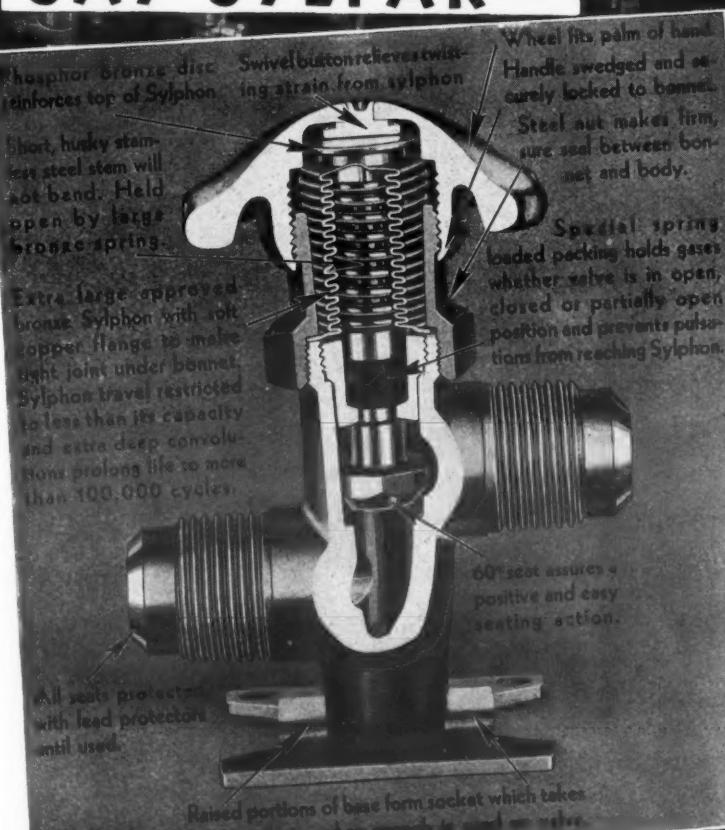
The oil pump maintains a positive circulation of oil without excessive splash effect, therefore, foaming is markedly decreased. Reduction of oil splash in turn reduces the tendency of any refrigerant present to mix with the oil supply, especially as there is no circulation of refrigerant vapors within the crankcase.

Location of the oil pump in such a machine must of course be carefully studied; some authorities recommend that it be at the lowest point in the case to insure against loss of suction and the resultant reduction in volume of oil circulated which might readily lead to impaired lubrication.

Others have studied and applied the principles of dry sump lubrication to good advantage, using a pressure pump for oil circulation and a scavenging pump for the test of this oil.

The viscosity bears a relation in that as it is increased the amount of refrigerant absorbed will decrease. In turn, larger amounts of Freon, methyl chloride, and Carrene are absorbed by mineral oils at higher pressures and lower temperatures,

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Fig. 6
(1)—Multi
Spring-dis
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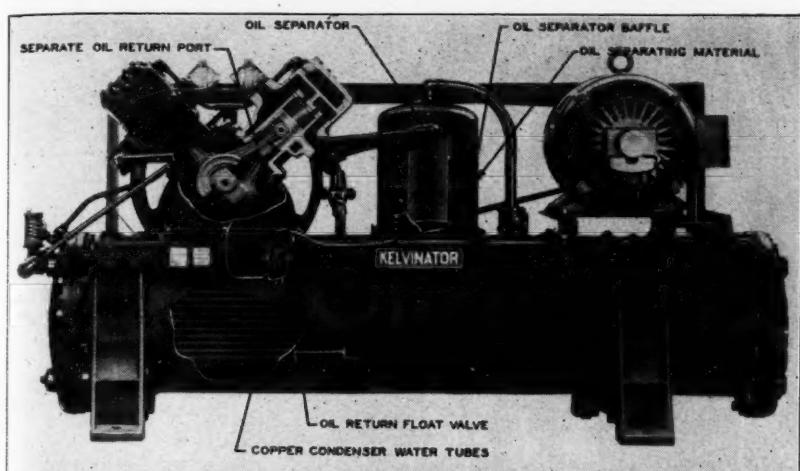
Oil Separator In Kelvinator V-Type

Fig. 5—The Kelvinator V-type condensing unit assembly showing certain of the parts pertinent to lubrication. Note location and construction of the oil separator.

Location Of Separator Is Important

(Continued from Page 14, Column 5) it should be placed between the discharge of the compressor and the point of entry of the gas into the condenser, because the oil must be removed before the gas is liquefied. Where the oil fails to function properly, the reason is often because the separator is set too near the compressor, the rush of hot gas preventing proper condensation and collection of the oil.

Oil will be practically always atomized to a certain extent by virtue of the heat of compression which is prevalent. This oil mist will naturally tend to pass into the system with the refrigerant, to condense and remain in the colder parts, unless it is effectively removed before it enters the condenser.

In consequence, the separator should be set as close to the condenser and as far away from the compressor as possible. It is always advisable that it should be of sufficient size to allow of ample reduction in the velocity of the gas in order to permit of effective separation. A smaller separator installed some distance from the compressor may often prove more effective than a large separator located nearby.

Where it is impossible to locate the main oil separator elsewhere than adjacent to the compressor, it is well to use an oil of as low an atomizing tendency as possible. This property will usually accompany high viscosity. The choice of a heavier oil would, therefore, solve the problem to some extent. In general, an oil of a viscosity of about 300 seconds

Saybolt at 100° F., will meet these conditions.

In compressors lubricated by controlled force feed the efficiency of an oil separator can often be checked by comparing the amount of oil removed from it with the amount fed to the compressor. Any extensive difference would indicate that the oil is not being entirely removed or trapped.

Allowance, of course, should be made for oil leakage around the stuffing box, although to just what extent this may occur will depend upon the design of the individual installation, the care given to lubrication, the original viscosity of the oil, and the means by which this oil is circulated or applied.

Designing For Lubrication

Compressor lubrication is being studied more and more with regard to its relation to capacity or efficiency. This will hold true regardless of the type of lubricating system employed.

There must be adequate lubrication, but not a continued excess, for immediately this latter occurs, the possibility of oil slugging will develop. Lindgren* has pointed this out most aptly in his discussion of Fig. 6. In his research pertaining to the smaller type of machines where an oil pump would be prohibitive due to cost and noise, he found that the capacity of the crankcase was especially important in the splash lubricated machine; the larger the crankcase the greater the possibility of reducing pressure variations and carrying a lower oil level.

The Baker system which was the applied to compressors of the Freon

*George Lindgren, in AIR CONDITIONING & REFRIGERATION NEWS, Nov. 4, 1938, concerning the Copeland design.

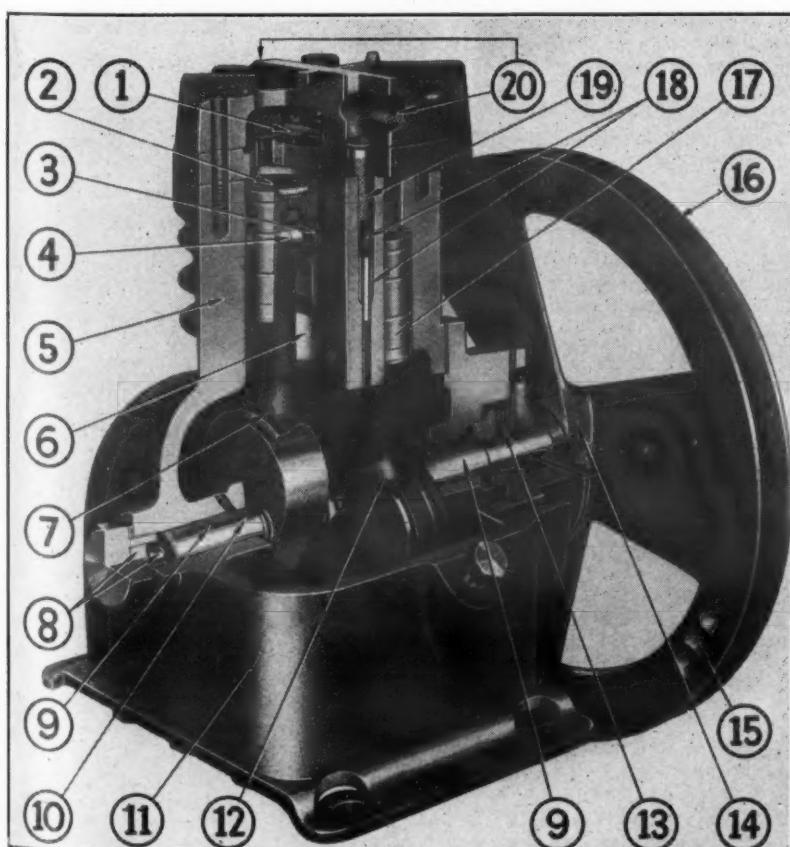
Cutaway Of Copeland Compressor

Fig. 6—The Copeland compressor: (1) Multi-reed discharge valve. (2) Spring-disc intake valve. (3) Lubricated wrist pin. (4) Spring thrust washer. (5) One-piece body. (6) Diamond-bored, micro-honed, hand-lapped cylinder walls. (7) Diamond-thrust ball with hardened insert and bored connecting rod. (8) Shaft plug. (9) Oversize bearing. (10) Eccentric shaft. (11) Crankcase. (12) Directional oil distributor. (13) Balanced seal. (14) Fan-blade type spokes. (15) Balanced flywheel. (16) V-belt drive. (17) Pistons. (18) Cylinder and piston oiling system. (19) Suction line screen. (20) Service valves in head cap.

and methyl chloride type provided a first method of force-feed lubrication plunger-actuated belt-driven pump, on the outside of the machine. Through nozzles piped inside the frame, oil was injected and sprayed to all the working parts. Today, Baker uses a gear-driven pump, however, direct-connected to the crankshaft, taking oil from the base of the compressor through filters of heavy felt and steel gauze. Thence it is pumped through the hollow crankshaft and connecting rods to all main bearings within the compressor.

Other research authorities—notably C. R. Neeson of Airtemp—have gone one step further in their application of force-feed lubrication by providing for a dry crankcase, using two oil pumps, one for pressure delivery,

the other for scavenging the crankcase.

Universal Cooler Corp., in turn, equip its larger compressors with an exterior tube connection from the oil sump to the force-feed rotary pump. Oil is delivered through the crankshaft to the crankpins and main bearings, and via a separate copper tube connection from the crankpins to the piston pins. This type of controlled lubrication facilitates control of the crankcase oil level and likewise reduces pressure variations and the tendency towards foaming.

Worthington-Carbondale has also perfected a full pressure lubricated vertical reciprocating compressor which is unique for its utilization of two separate lubricating systems:

(1) A gear-type oil pump with

filter attachment for delivery of oil under uniform pressure to all the bearings; and

(2) A mechanical lubricator for measured delivery of oil to the cylinders and piston rod packing.

Flood lubrication of the cylinder walls is prevented by the use of piston rod packing where the rods pass from the cylinders into the crankcase. The latter, in turn, being entirely enclosed and pressure tight, precludes any possibility of dilution of the crankcase oil by the refrigerant or loss of oil by entrainment with the latter.

Methods Of Lubrication

The intricacy of the lubricating system will depend upon the type (Concluded on Page 16, Column 3)

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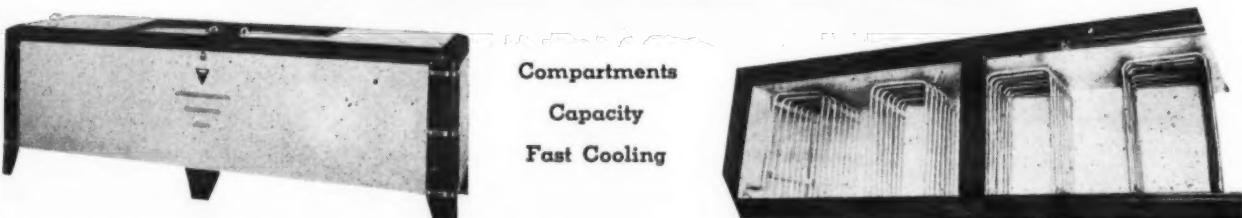
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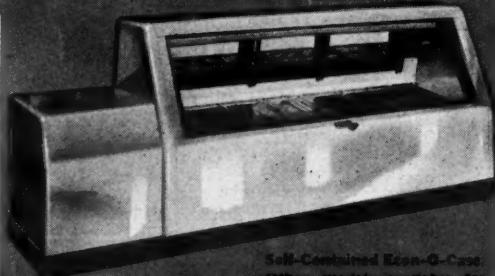
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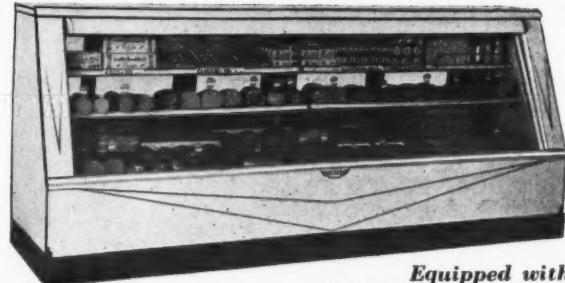
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SIZES AND TYPES TO TAKE CARE OF EVERY PROSPECT

Compressors Designed For Best Lubrication

(Concluded from Page 15, Column 5) and capacity of the compressor. The centrifugal machine requires the least complex system since there are only the bearings of the rotor to be lubricated. These are taken care of by ring oilers. Simultaneously, however, the oil performs an additional function in maintaining an automatic oil seal against loss of vacuum.

Reciprocating compressors on the other hand, present more parts to be lubricated and require circulation of the oil. This is accomplished by splash or force feed. The former is particularly applicable to the fractional tonnage units so widely used for household refrigeration.

While the idea has been taken from automotive practice, some very unique means have been provided by certain manufacturers to assure of positive circulation especially to the cylinder walls. Stewart-Warner, for example, has cut grooves in the sides of the pistons to develop a positive oil supply, using special oil slinger paddles attached to the eccentric to splash oil onto the cylinder walls and into the reservoirs, which lead to the bearings.

Servel in turn builds a special oil feed into the piston itself to assure that this latter will be self-lubricating.

The Use Of Splashes

Splash lubrication is devoid of the possibility of starved lubrication provided the compressor parts are designed for thorough circulation of the oil after this is begun by the crank splash elements. All that is necessary usually is to maintain a suitable oil level to enable the splashes to dip to a sufficient extent at each throw of the crankshaft.

Copeland assures this by employing splashes so placed that they will pick up oil even though the level may be below the point at which a conventional crank would be "out of oil" so to speak.

Pressure Systems

With the advancements in heavier tonnage design to meet the requirements of commercial refrigeration and air conditioning, the adaptability of pressure became the subject of considerable research, designed to function either alone or together with splash. Here the objective was to obtain positive circulation of oil throughout the compressor and to eliminate foaming as far as possible.

Obviously in a splash lubricated reciprocating compressor, foaming will always be present. The extent to which it may be objectionable will depend upon the oil level, and the location of the suction valves. Inasmuch as the unit type of compressor usually takes its suction through the crankcase, if the foam level rises to a sufficient degree, foam may be carried over to the high side with the refrigerant to cause serious retardation of heat transfer.

Ultimately, if allowed to continue, cleaning of the system may be necessary. The attendant expense is, of course, objectionable. To obviate this some builders have arranged their design so that all refrigerant gases and vapor are excluded from the crankcase.

Universal Cooler's Force-Feed Pump

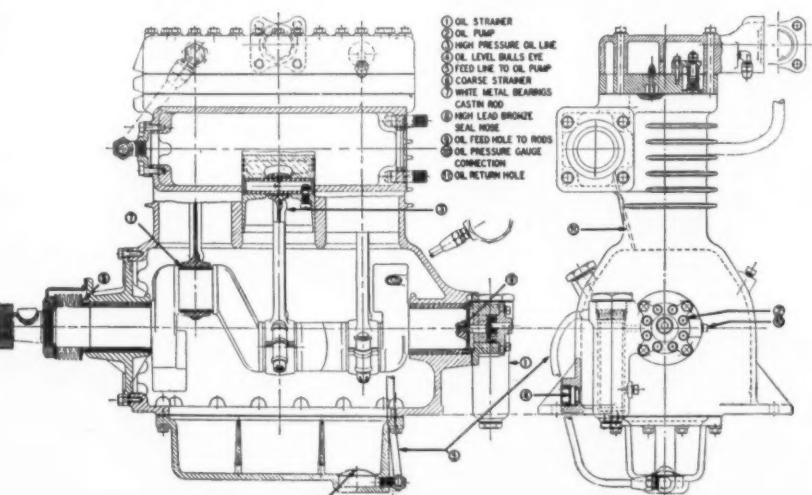


Fig. 8—The Universal compressor in sectional detail showing certain of the parts pertinent to lubrication. A noteworthy feature is the force-feed rotary oil pump connected by exterior tubing to a sump of ample capacity to permit the oil to rest.

Lubrication In Baker Compressor

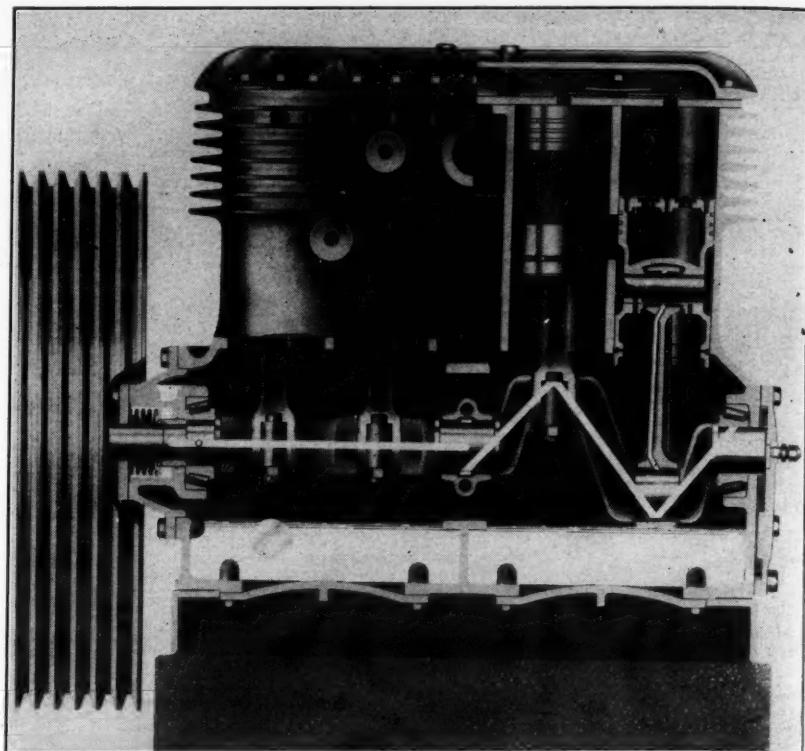


Fig. 7—The Baker Freon compressor showing oil level in the crankcase, path of oil flow (by white lines) through crankshaft and connecting rods; and the application of roller bearings at the outboard ends.

An added advantage can be obtained by adequate sealing of the lubricating system. This is the practice at Vilter, where the force-feed lubricating system is of the hermetically sealed internal type. In this design an automatic reversible gear pump is used, the system being so arranged that the stuffing box is kept flooded with oil; this provides an oil seal at the contact faces of the metal seal, to assure proper lubrication, prevent gas leakage, and eliminate overheating of the seal rings.

Pump Design

It is extremely interesting to note the advancements which have been made by the industry in perfecting pumping devices for positive handling of lubricating oil throughout the compressor mechanism.

Today there is a definite trend towards controlled lubrication, especially where dealing with refrigerants which are miscible with mineral lubricating oils. This has required consideration of strainers and oil separators along with pump design.

All are more or less related to compressor efficiency and capacity, viz., a continued excess of oil will lead to slugging and reduction in efficiency, yet there must be a slight excess on starting to assure of positive lubrication of piston and cylinder walls, especially in the reciprocating machine. This can be assured by proper pump adjustment.

Obviously in a splash lubricated reciprocating compressor, foaming will always be present. The extent to which it may be objectionable will depend upon the oil level, and the location of the suction valves. Inasmuch as the unit type of compressor usually takes its suction through the crankcase, if the foam level rises to a sufficient degree, foam may be carried over to the high side with the refrigerant to cause serious retardation of heat transfer.

Ultimately, if allowed to continue, cleaning of the system may be necessary. The attendant expense is, of course, objectionable. To obviate this some builders have arranged their design so that all refrigerant gases and vapor are excluded from the crankcase.

The normal location of such a pump is in the base of the crankcase of the compressor, although some

designers prefer to place this pump at the lowest part of the case. Others are of the opinion that the pump should be set just above a depression or catch basin in the case to provide means for trapping foreign matter and preventing it being circulated through the lubricating system. Usually, however, foreign matter in a well designed system using properly refined oil will be conspicuous by its absence.

Williams in its Ice-O-Matic unit provides for "dry sump" lubrication, like Airtemp, employing a rotary gear pump and an auxiliary tank adjacent to the crankcase to which all return oil is drained.

Irrespective of the location of the pump, however, suction is automatically maintained by gravity, since the pump is below the normal oil level. In a typical system the discharged oil, under pressure according to the speed of rotation of the gears and their relative tooth dimensions, is led from the discharge side of the pump to the connecting rod bearings and other elements by drilled passages and suitable piping connections. As oil passes out from the bearing clearance spaces, or drips from the cylinder walls or other parts of the interior housing, it returns to the case or oil sump by gravity for recirculation.

Universal Cooler Corp. provides the added precaution of a strainer on the inlet side of the pump.

Rotary Operation

The principles of rotary motion are involved in the floating blade type of oil pump. Two blades, free to move in a slotted rotor, serve as the pumping media.

In the General Electric design this rotor is fixed to the lower end of the vertical motor shaft. The oil is carried in the base of the unit, being drawn up and pumped through a passage drilled in the motor shaft and thence through other passages to the yoke arrangement and lower shaft bearings. The majority of the oil, however, goes to the self-aligning top bearing and to the cylinder wall. On leaving these elements, part of this oil returns to the base, the remainder flowing through the stator of the motor to cool the windings.

The Oscillating Cylinder Type

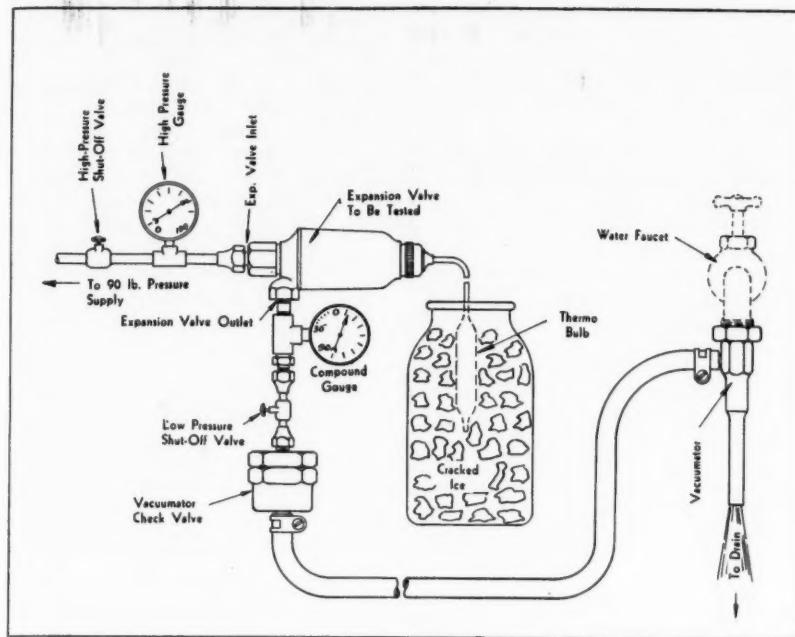
This is another General Electric type of pump which has been used in connection with commercial refrigerating units. It is a single cylinder reciprocating mechanism operated from an eccentric on the end of the crankshaft.

The entire assembly is located so as to be readily accessible for inspection without removal of the other parts. This pump is designed to supply oil under pressure directly to the two main bearings. From here oil is passed through holes in the crankshaft to the connecting rod bearings, center bearing, and shaft seal. Through tubes a part of this oil is also pumped to the piston pin bearings.

The cylinder walls, however, in any machine equipped with this type of pump are splash lubricated.

Service

Test Setup For Expansion Valves



The drawing shows the method of hooking up the equipment to test the operation of an expansion valve in the field with the use of an American Injector "Vacuumator."

Automatic and Thermostatic Expansion Valves May Be Tested In Field With 'Vacuumator'

DETROIT—Means for inspecting and testing automatic and thermostatic expansion valves in the field have been developed by American Injector Co. through use of its "Vacuumator" vacuum dehydrator, in combination with other appliances commonly carried by the refrigeration service man.

Use of the Vacuumator (which operates from the water pressure from a standard water faucet) in cleaning and drying refrigeration systems was described in the April 20 issue of the NEWS.

In addition to giving the service man an additional source of profit, the new field-testing method speeds up the handling of expansion valve servicing by eliminating much of the necessity of returning the valve to the manufacturer for checking and adjustment, with its attendant delays, correspondence, and bookkeeping transactions.

Used with the Vacuumator in testing and inspecting valves under this system is a hook-up consisting of high and low-pressure valves (one of each), a service cylinder of refrigerant, high-pressure gauge, compound gauge, and the necessary fittings to make the assembly.

The Vacuumator comes equipped

with a water-operated injector, rubber tubing, and check valve. Assembly of the hook-up is shown in the accompanying diagram.

Pressure supply of 90 lbs. per sq. in., either from compressed air or drum of refrigerant, is required. If refrigerant (either Freon or methyl chloride) is used, the drum should be heated, if necessary, to obtain the pressure desired.

High pressure gauge is used to check high pressure to inlet of the expansion valve being tested, and the compound gauge to check pressure obtained through the expansion valve.

Also required is a jar of cracked ice, so that a bath of 32° F. can be obtained.

RECOMMENDED PROCEDURE

Recommended procedure in testing expansion valves with the equipment is as follows:

1. Screw in adjusting stem on expansion valve, or adjusting nut on thermostatic valve until valve orifice is wide open. Then wash out thoroughly with carbon tetrachloride to remove dirt or thick oil.

2. Connect valve as shown in diagram with Vacuumator connected to water faucet. A water pressure of 25 to 30 lbs. will produce a vacuum of 28 inches of mercury.

3. Turn on water full flow and open low-pressure shut-off valve; a vacuum will be drawn on the valve. (On thermostatic type, insert bulb into cracked ice bath and allow few seconds to cool to 32°.)

Open shut-off valve in high-pressure line. The setting of the valve may now be read on the compound gauge, either as pounds pressure or inches of vacuum, according to setting.

POWER ELEMENT TEST

4. To test action of power element on thermostatic valve, remove thermo bulb from ice bath and warm it in the hands or in water at room temperature. As bulb warms up, the pressure will rise sharply for several pounds, and will be indicated on the compound gauge.

5. To test valves for needle leaks, close low-pressure shut-off valve and pressure will build up sharply for a few pounds and then stop rising if the needle does not leak. (On thermostatic type, insert bulb in ice bath, close low-pressure shut-off valve and pressure will build up sharply for a few pounds and then stop rising, or rise very slowly due to expansion of refrigerant in bulb.) If pressure continues to build up rapidly, there is a leak at the needle. A leaky needle will allow pressure to build up until pressure in valve is the same as the high pressure side.

Service Man Awarded 'Ham' Radio Prize

HARRISBURG, Ill.—The Paley Award, offered annually by the president of the Columbia Broadcasting System to the "ham" radio operator rendering the most outstanding public service during the preceding year, has been awarded this year to Robert T. Anderson, service man for Harrisburg Standard Electric Corp., Crosley distributor here.

The award was made in recognition of Mr. Anderson's work in connection with the evacuation of the residents of Shawneetown, Ill., during the 1937 flood. The radio receiver which Mr. Anderson used in this work was a Crosley battery set, model 695.

Presentation of the award will be made in the Columbia studios in New York City early in July.

Anderson Heads Western Sales For Thermal Co.

ST. PAUL—Walter H. Anderson has been appointed sales manager of the western division of Thermal Co., Inc., refrigeration and air-conditioning supplies jobber, reports H. W. Small, president. Mr. Anderson will contact distributors, and manufacturers throughout eastern Montana, North Dakota, parts of western Minnesota, and South Dakota.

John Coe Named President Of Mill Organization

HOT SPRINGS, Va.—John A. Coe, of American Brass Co., was named president of the Copper and Brass Mill Products Association at the organization's annual spring meeting here recently. The organization includes manufacturers of sheet, rod, wire, pipe, tube, and other mill products of copper, brass, bronze, and related alloys.

Other officers named were R. E. Day, Bridgeport Brass Co.; Wylie Brown, Phelps Dodge Copper Products Corp., and R. L. Coe, Chase Brass & Copper Co., vice presidents; C. D. Dallas, Revere Copper & Brass, Inc., treasurer; and T. E. Veltfort, secretary.

Westinghouse Switchgear Sales Under Frenger

EAST PITTSBURGH, Pa.—R. F. Frenger has been appointed sales manager of the switchgear division of Westinghouse Electric & Mfg. Co., succeeding W. R. Swoish, who has been transferred to Chicago as head switchgear specialist for the northwestern district. A. C. Streamer, manager of the division, has announced.

Mr. Frenger was transferred from the staff of Ralph Kelly, vice president, and previously had been manager of the small motor division.

Detroit Rex Products Opens San Francisco Branch

SAN FRANCISCO—A new branch office with warehouse stocks of solvents has been opened here by Detroit Rex Products Co., Detroit, manufacturer of "Drex" degreasers, "Perm-a-Clor" and "Triad" solvents, and "Triad" alkali cleaners and strippers.

W. A. Vensel, west coast manager, is in charge of the new office.

Cranston Retires as Coast Manager Of G-E

SAN FRANCISCO—James A. Cranston, 76-year-old pioneer in electrical appliance merchandising in the west, has retired from active service as commercial vice president and Pacific Coast manager of General Electric Co.

Mr. Cranston first began selling electrical equipment in 1889 for the Northwest Thomson-Houston Co. in St. Paul. Three years later he joined the General Electric Co. as manager of the northwest territory, with headquarters at Portland, Ore.

In 1923, Mr. Cranston moved to San Francisco to become Pacific Coast manager for the company, and in the same year was elected commercial vice president.

THE BUYER'S GUIDE



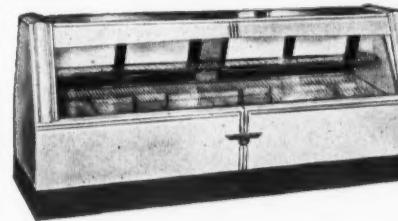
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Multiple Temperature Snap-Action Valve

Without Bellows Strain!



Opens and closes, regardless of range or differential setting, with a positive snapping action at any previously determined setting.

Permits the use of a variety of evaporators at widely differing temperatures to be handled by a single Compressor up to its maximum load possibilities.

Adjustable as to range from approximately 20" of vacuum to 60 lbs. pressure with an adjustable differential of from 7 lbs. to 29 lbs. at any pressure range.

For any refrigerant except ammonia.

Thousands of these valves are furnishing excellent service throughout the refrigeration world.

Complete information on American Injector Company products, including Expansion Valves, Constant Pressure Valves, Throttling Valves, Water Regulating Valves, Oil Separators, High Side Floats, and many other splendid items available from your Jobber or

AMERICAN INJECTOR COMPANY
1481 Fourteenth Avenue
DETROIT, MICHIGAN

A Selling and Servicing Opportunity! THERE'S PROFIT FOR YOU —When You Spot This Common Trouble



ACTION-AIR SYSTEM

When your customer's cooler doesn't work right—when dead air spots and freezing zones impair foods and the humidity is too high or too low—it's time for you to show him Action-Air System—a patented system of correct air circulation in coolers. Sells itself on a demonstration. Pays for itself out of savings. Makes good profit for you—adds enthusiastic new customers—leads to repeat business. Used in wide variety of applications since 1932. Write for our attractive proposition today.

THE BROWN CORP., 615 Bellevue Ave., Syracuse, N.Y.

ACME
INDUSTRIES
INC.

REFRIGERATION

AIR CONDITIONING

PIPE COILS • FINNED COILS • SHELL AND TUBE CONDENSERS • WATER COOLERS

UNIT COOLERS • OIL SEPARATORS • ACCUMULATORS • LIQUID RECEIVERS • SPECIALTIES

JACKSON, MICHIGAN



BEARSE MANUFACTURING CO.
2815-2825 Cortland Street, Chicago, Illinois

Major Appliances

Electric Roaster Sales Show Gains Over '37 For Georgia Power

ATLANTA—Despite a drop in sales of most other electrical appliances, electric roasters are showing sizeable gains over 1937 sales in the territory of Georgia Power Co. during the first four months of the year, according to figures reported to headquarters here.

Roaster sales through April this year total 140 units, compared with 59 in the same period of 1937. Sales of ventilating fans also are higher than corresponding 1937 figures, 32 such sales being reported as against six last year.

Sales of other appliances are down from their 1937 marks. Electric refrigerator sales through April totaled 952 units, against 3,066 last year; electric range sales were 451 units, against 1,645.

Detrola Announces New 'Pee-Wee Jr.' Radio

DETROIT—Now, to join the Pee-wee and the Super Pee-wee, comes Detrola Corp.'s latest addition to its line of Pee-Wee radios—Pee-Wee Jr. Listing at only \$10, Pee-Wee Jr. (or model 216) is a four-tube, a.c.-d.c., straight broadcast receiver operating on a frequency of from 540 to 1,720 kilocycles.

It is housed in a walnut-covered Bakelite cabinet styled by George Walker, industrial designer. This cabinet measures 6 1/4 inches wide, 4 1/4 inches high, and 4 inches deep. Total weight of the unit is less than 4 lbs.

The \$15 standard Pee-Wee has been changed to a two-band receiver. A switch on the back of the set converts it into a short-wave receiver for police, amateur, and aviation calls. Formerly model 197, it now is known as model 218.

Combination Range



New Tinnerman gas range has an electric element for low-temperature cooking.

Gas Range Combines Electric Element

CLEVELAND—A new gas range with a built-in electric cooking element in the upper left compartment has been announced by Tinnerman Stove & Range Co. here.

Object of this combination range, it is claimed, is to enable the housewife to bring foods to cooking temperatures quickly on the top gas burners and then place the cooker, which is part of the equipment, on the electric element with the switch at "low" for low-temperature cooking.

Electric element is controlled by a three-position switch with high, low, and medium range. A five-quart aluminum cooker with three insert pans is designed for use on the electric element as well as on the gas burners.

A wire basket also is provided for warming plates and dishes on the electric element.

The four gas elements extend in a line the full width of the range and are on the back half of the top surface. This is said to avoid crowding of utensils and danger of burns from reaching over lighted burners.

All switches and controls are mounted on a panel inside the upper left compartment, panel being concealed when the compartment door is closed. The door may be closed while the range is in operation, or may be left open at an automatic stop position.

The range also contains an oven and two bottom storage compartments. It will be displayed at the American Furniture Mart next month.

Surveys Show Electric Range Is Setting Pace

For Appliances, Mauger Tells Nema Group

ATLANTIC CITY, N. J.—National sales of electric ranges have increased eight-fold in the past five years to set the pace for the fastest rate of development in the electrical appliance field, Harry Mauger, chairman of the electric range section of National Electrical Manufacturers Association, stated in a committee report at the recent Nema meeting here.

Ratio of sales of electric ranges to sales of gas ranges has dropped from 1 to 15 respectively in 1933 to 1 to 4 at the present time, Mr. Mauger reported.

"This can only be interpreted in terms of public recognition of the greater desirability of the electric range," Mr. Mauger declared.

In a recent survey of housewives' cooking preferences and habits in all sections of the country, Mr. Mauger pointed out, 55% of the gas range users interviewed said that they considered electric cooking superior in several ways to gas cooking, and 33% of the gas range users said that their next range would be electric.

Another survey of 1,384 homes in 19 cities revealed that the average cost of electric cooking is \$2.30 a month, Mr. Mauger said in his report.

The report also indicated that preference for the electric range is being shown in the present widespread kitchen modernization movement. In a contest sponsored by Better Homes & Gardens magazine, Mr. Mauger showed, 46% of the

approximately 10,000 new kitchen plans included electric ranges as compared to 37% including gas ranges.

Still another survey, recently conducted by the research bureau of DePauw university, showed that of 10,000 Chicago families, the number planning to buy electric ranges exceeds by 7 1/2% the number intending to buy gas or other type ranges.

Ladies' Home Journal interviewed a thousand women in 10 different cities, Mr. Mauger declared, and more than 38% said that their next range would be an electric one.

"It is an actual fact," the report stated, "that in many leading cities today it is cheaper to cook by electricity than by gas. Because of the inherent quality of electric heat without combustion, the electric range has 2.63 times the thermal efficiency of the modern gas range."

Referring to the present national campaign being staged by the gas industry, the report indicated that electric range manufacturers appreciate the promotion for furthering interest in kitchen improvement. It is realized, the report averred, that many utility companies have heavy investments in both gas and electricity, and that they naturally want to protect their gas investment.

"However," the report concluded, "the manufacturers are convinced that even for these companies the electric range load is the most profitable."

THE BUYER'S GUIDE

DEPENDABLE Pipe and Tube FITTINGS

For flared tube and pipe fittings the refrigeration industry has, ever since its birth, relied on Commonwealth Brass Corporation as a preferred source of supply.

Having grown up with the industry it is natural that Commonwealth should be able to furnish any desired specification in standard, semi-standard or special fittings.

Because of volume production Commonwealth is able to deliver, promptly, from stock any quantity from 100 pieces upwards.

Every fitting is Seepage Proof, with threads and seats accurately machined and having tube seats protected in shipping.

COMMONWEALTH FITTINGS
Built Right To Stay Tight

COMMONWEALTH BRASS CORP.
Commonwealth at Grand Trunk R. R.
DETROIT, MICH.

"The RECORDS WILL SPEAK FOR THEMSELVES!"

Modern practice in refrigeration and space cooling calls for permanent records—and that means Marsh Recording Instruments. Recording Gauges are available with charts reading for ammonia, Freon and other refrigerants. Recording thermometers are also available for all standard applications. Multiple pen instruments may be used to record either temperature at several points or both pressure and corresponding temperature.

JAS. P. MARSH CORPORATION
2067 Southport Ave., Chicago, Ill.

MARSH Refrigeration Instruments

MILLS COMPRESSORS for Commercial Use

Mills Novelty Company • 4100 Fullerton Avenue • Chicago, Illinois

HENRY Dehydra-Strainer

Combination Dehydrator and Strainer

With dispersion tube. Dehydrant is located inside asbestos sack supported in turn within a fine mesh brass screen. 2" O. D. x 12" long flanged brass shell. Dehydrant capacity 20.5 cu. in. Weight 3 1/2 lbs.

HENRY VALVE CO. 1001-19 N. SPAULDING AVE., CHICAGO, ILLINOIS
STOCKED BY LEADING JOBBERS

TYPE
733

WITH
ASBESTOS
SACK

CLEVELAND—A new line of home washing machines, known as the Apex Spiral Dasher washers, has been introduced by Apex Rotarex Corp.

Feature of this new unit is the "Spiral Dasher" agitator, which has three vanes, each of which is perforated and provided with both vertical and horizontal cleansing ridges.

The agitator is designed in a spiral so that each vane forms a spreader cup at the top and bottom of the agitator. By this means the clothes are forced outward and kept from tangling.

Another new development embodied in this washer is the so-called "free running" mechanism. The gears operating the agitator are so constructed that they are disengaged when the agitator is not operating. The wringer mechanism runs free from the excess drag.

The new line consists of 10 models, four with pumps, four without pumps, and two powered by gas engines. Tubs are available in sizes to accommodate 6, 7, 8, or 9 lbs. of clothes. The unit has an all-white finish with aluminum trim. Tubs are porcelain inside and out. Metal parts are Bonderized and finished in white enamel.

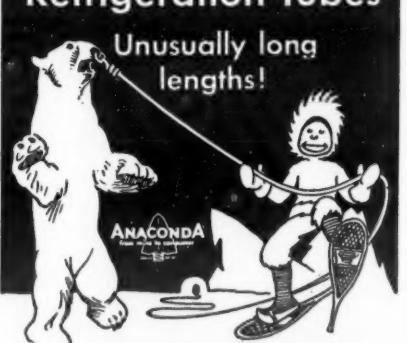
To promote the new line the company has prepared a new broadside, designed for both dealers and consumers, which tells the story of the new line. Charts showing the results of laboratory tests also are shown. One complete side of this promotion piece shows various models of the Apex line. The broadside is intended to be hung on the wall of the dealer's sales room.

through an ordinary 26-inch door, and requires no assembly.

A. W. Shields, formerly associated with the Silver Dome Trailer Co. and the Bender Body Co., Cleveland, has been engaged as sales manager in charge of Evanoil products. Ralph Bealls, formerly sales manager of heating products for the Norge division of Borg-Warner Corp., has been appointed regional manager in the Chicago area, and George L. Schuyler, formerly with Conditioned Air Corp., Detroit, is manager for the Middle Atlantic states.

Anaconda Copper Refrigeration Tubes

Unusually long lengths!



THE AMERICAN BRASS CO.
FRENCH SMALL TUBE BRANCH
General Offices: Waterbury, Conn.

Uniform COMPRESSOR CASTINGS

For nearly a million refrigeration and air conditioning units have been produced by Nelson in the past five years. If your compressor specifications call for QUALITY castings,

Let us quote!

NELSON BROTHERS CO.
SAGINAW, MICHIGAN

VIRGINIA QUALITY

- V-METH-L
- EXTRA DRY
- ESOTOO
- METHYLENE CHLORIDE

VIRGINIA SMELTING CO.
W. NORFOLK, VA.

QUESTIONS

Methyl Alcohol

No. 3269 (Parts Jobber, Maryland)—"We are very much interested in obtaining for resale to the refrigeration trade anhydrous methyl alcohol. We would like to purchase this in sealed quart cans, so that we can sell it across the counter to the refrigeration trade in the same containers in which we receive it."

"We do not know of a source of supply and are wondering if you, with your wide variety of information sources, can assist us in this matter."

Answer: We understand that methyl alcohol can be purchased in sealed quart cans from E. I. du Pont de Nemours & Co., Inc.

Absorption Milk Cooler

No. 3270 (Manufacturer, Chicago)—"In your April 27 issue of AIR CONDITIONING & REFRIGERATION News you had an article on page 19 concerning an absorption-type milk cooler."

"I would be very much interested in knowing if you can furnish me with the name of the distributor who is handling this cooler in the United States. If not, to whom could I write to get additional information?"

Answer: We do not believe that this particular product is being distributed in this country at the present time.

For further information about this product and its commercial possibilities, write to the Bureau of Foreign & Domestic Commerce and refer to the report made on this item by John C. Wiley, American Consul General at Vienna.

Leak Detector

No. 3271 (Parts Jobber, Connecticut)—"We have had an inquiry for an alcohol-type leak detector known as the Workrite. Will you be good enough to acquaint us with the name of the firm manufacturing this item?"

Answer: We are not acquainted with the leak detector known as "Workrite." The following are manufacturers of leak detectors and probably one of them makes the product known by that name:

Hull Mfg. Co.
Prospect Ave., Hagerstown, Md.
Imperial Brass Mfg. Co.
1200 W. Harrison St., Chicago, Ill.
Leni Mfg. Co.
Newton Lower Falls, Mass.
Linde Air Products Co.
30 E. 42nd St., New York, N. Y.
Turner Brass Works, Sycamore, Ill.
Frigidaire Division
General Motors Sales Corp., Dayton, Ohio

Trade-In Allowances

No. 3272 (Distributor, New York)—"In one of your recent issues, an article was published relating to a book mentioning the standard trade-in allowances on electric refrigerators.

"This book as we understand is similar to the 'Blue Book' used throughout the automobile industry.

"We sincerely want a copy of this book if possible. . . ."

Answer: We believe that you have reference to the "National Market

**PENN Leads in
AUTOMATIC SWITCHES
AND CONTROLS**
Write for Catalog
PENN ELECTRIC SWITCH CO.
GOSHEN, INDIANA

SAVE 20-40%
Write for details of
Alco's new Small
Capacity "TK"
Thermo Valve
Alco Valve Co. - St. Louis, Mo.

BRUNNER
Send for the New
REFRIGERATION CATALOG
Seven Models of Compressors
Fifty-eight Models of High-
sides from $\frac{1}{4}$ H.P. to 15 H.P.
BRUNNER MANUFACTURING CO.
UTICA, N. Y.

**Index of Trade-In Values for Used
Refrigerators** published by Herman
Hantober, 96 Fifth Ave., New York,
N. Y.

You will also find much information
on trade-in schedules in the appendix
to "Appliance Selling Today."

Sales By States

No. 3273 (Association, Louisiana)—"We would like to have the following information:

"Number of mechanical refrigerators sold in the states of Arkansas, Louisiana, and Mississippi during the months of February, March, April, and May, 1938."

"If you can give us this information at your earliest convenience, we will greatly appreciate your cooperation."

Answer: Sales by state figures for February, March, and April were published in the June 1 issue of AIR CONDITIONING & REFRIGERATION News. May figures are not yet available.

Refrigerant Controls

No. 3274 (Manufacturer, Illinois)—"Your 1936 Refrigeration and Air Conditioning Specifications' lists under evaporators the type of refrigerant control used on all domestic refrigerators up to 1936."

"We are wondering if you could supply us with this information on 1937 and 1938 models. Any help you can give us will be greatly appreciated."

Answer: We do not have at the present time complete data on the type of refrigerant control used on household electric refrigerators, 1937 and 1938 models.

Since 1936 the Refrigeration Division of the National Electrical Manufacturers Association, comprising many of the larger companies in the industry, have abided by an association agreement on specifications, whereby they have agreed to publish only portions of the specifications information about their yearly models, during the year in which the models are current. Refrigerant controls are one of the items omitted.

However, the association has agreed to provide us with full information on these models so that we can bring up to date the "1936 Refrigeration & Air Conditioning Specifications Book" which has the data for all the years up through 1936. We cannot say at this time when the appended Specifications Book will be available.

However, if you have kept a file of back issues of REFRIGERATION News, you will be pretty sure to find the information you are seeking, for most makes, in the news stories on the various new models which appeared in the News starting with last October and continuing through February.

Commercial Manuals

No. 3275 (Service Man, Virginia)—"Have you a catalog or folder listing and describing the literature you have for sale on the construction and maintenance of commercial refrigerating machines?"

"I refer especially to systems using ammonia or F-12 as refrigerants."

Answer: We would suggest that you obtain our series of "Master Commercial Refrigeration Service Manuals."

These books contain complete instructions on the operating cycles and service methods for the standard types of commercial refrigeration equipment. Following are the chapters in each of the three manuals:

Manual No. C-1: Chapters (1) Theory of Refrigeration; (2) Principles of Commercial Refrigerants; (3) Properties of Commercial Refrigerants; (4) Refrigerant Cylinders, Valves & Safety Devices; (5) Transferring Refrigerants to Smaller Cylinders; (6) Dehydrating Commercial Refrigerants.

Manual No. C-2: Chapters (7) Commercial Condensing Units; (8) Water Regulating Valves; (9) Flooded Evaporators and Float Systems; (10) Two-temperature Flooded Systems.

Manual No. C-3: Chapters (11) Expansion Evaporators; (12) Thermostatic Expansion Valves; (13) Pressure & Temperature Controls; (14) Refrigerant Control Valves; (15) Motors, Starters, and Overload Relays.

Would also suggest that you get a "Refrigeration Engineer's Manual" which is a guide for operators of industrial refrigeration systems.

The Commercial Manuals sell for \$1.00 per copy or \$3.00 for the set and the "Refrigeration Engineer's Manual" is priced at \$3.00 per copy.

Data On 'Meter Miser'

No. 3276 (Engineer, Michigan)—"Can you tell me where I can find some descriptive information about the 'Meter Miser' compressor used in Frigidaire's 1938 refrigerators?"

Answer: A description of some of the new features of the 1938 Frigidaire "Meter Miser" was published on page 13 of the Dec. 8, 1937, issue of AIR CONDITIONING & REFRIGERATION News.

CLASSIFIED ADVERTISING

RATES: Fifty words or less in 6-point light-face type only, one insertion, \$2.00, additional words four cents each. Three consecutive insertions \$5.00, additional words ten cents each.

PAYMENT in advance is required for advertising in this column.

REPLIES to advertisements with Box No. should be addressed to Air Conditioning & Refrigeration News, 5229 Cass Ave., Detroit, Mich.

POSITIONS AVAILABLE

SALES MAN ACQUAINTED with distributors and utilities throughout country will find great opportunity for profit in sale of electric ranges and refrigerators and allied lines at sharply competitive and very attractive prices to these classes of trade. Bonus for volume should mean high earnings. Reply Box 1055, Air Conditioning & Refrigeration News.

POSITIONS WANTED

ENGINEER, 10 years' experience in design and development of automatic absorption machines. Air and water cooled, continuous and intermittent types. Available July first. Write Box 1052, Air Conditioning & Refrigeration News.

R.A.C.I. GRADUATE in refrigeration and air conditioning. One year's experience in domestic and commercial refrigeration service; ten years' experience as a machinist; one year shop foreman, machine tool division. LaSalle training in production control methods. Desire work in air conditioning or commercial refrigeration. College graduate; age 40. Box 1053, Air Conditioning & Refrigeration News.

SALES EXECUTIVE. An outstanding, successful, seasoned executive with an unusually fine record covering nineteen years' experience in productive sales management and field sales supervision for nationally known organizations is desirous of making a change. Now employed and doing an exceptionally fine job in commercial refrigeration and beverage cooler sales. Has wide personal following among the best distributors, jobbers, dealers, and national accounts in North America. Makes sales producers of men and is a real salesman himself. Decisive, pleasing personality—quick to adjust himself. Knows appliances, domestic and commercial refrigeration for all trades. Is married, Christian, has college education. Nationally known, a live wire and sales producer and interested in a permanent sales connection with reliable company. Box 1056, Air Conditioning & Refrigeration News.

EXPERIENCED INSTALLATION and serviceman. Five years' experience on all types domestic and commercial machines, including beer cooling and dispensing equipment, meat markets, apartments, etc. Good references. Will go anywhere. Own car and tools. Write G. GEISSLER, 101 32nd St., No. Bergen, N. J.

ENGINEER WITH sales experience available July 25. Electrical engineering graduate. Age 26. Free to travel. With major manufacturer and factory branch 2½ years. Experimental, testing, research, residential and commercial air conditioning and refrigeration applications, cost estimating, proposals, heating surveys, and sales engineering. Teaching and executive ability. Personnel record if requested. Box 1057, Air Conditioning & Refrigeration News.

BUSINESS FOR SALE

UNUSUAL OPPORTUNITY for capable serviceman. I have a service and installation business for sale at a fraction of its actual value. 100% return on your investment in one year! Estimated on 1936, 1937 and 1938 business. Manufacturer's service and installation contract, averaging \$90.00 per month. Two creamery accounts averaging \$50.00 per month. Large clientel acquired thru 13 years' service experience. City of 35,000 in southern California with large provincial territory. Write for additional details, now! Box 1054, Air Conditioning & Refrigeration News.

FRANCHISES AVAILABLE

DISTRIBUTORS WANTED for newly developed, self-contained Midget display refrigerator. The only case listed for less than \$300.00. All nationally advertised parts including twin-cylinder compressor. Just plug in and use. Well insulated; porcelain exterior and interior; three shelves. Size 40" wide, 52" high, 28" deep. Easy to sell wherever food is purveyed. Good discount to distributors. Write for literature. CONTINENTAL FOOD STORES EQUIPMENT CORP., 2697 Third Ave., Bronx, N. Y.

EQUIPMENT WANTED

INTERESTED IN purchasing 500 to 1,000 $\frac{1}{2}$ and $\frac{1}{4}$ H.P. refrigeration motors—new or used repulsion induction or capacitor type. Also interested in purchasing single or twin cylinder late type household compressors. Any quantity. FEDERAL REFRIGERATOR CORP., 57 E. 25th St., New York City.

REPAIR SERVICE

DOMESTIC CONTROLS repaired: Ranco pencil \$1.75, Ranco box \$2.00, General Electric \$2.00, Tag \$2.00, Cutler-Hammer \$2.00, Penn \$2.00, Bishop Babcock \$2.50, Majestic \$2.50, Penn magnetic \$2.50, G. E. Frigidaire \$2.50. In business over 20 years. Our name is our guarantee. UNITED SPEEDOMETER REPAIR CO., INC., 436 West 57th Street, New York City.

CONTROL REPAIR service. Your controls repaired by expert mechanics, with special precision equipment. Supervised

by graduate engineers. We stress perfection and dependability before price. One year guarantee on domestic controls. Any bellows operated device repaired. HALECTRIC LABORATORY, 1793 Lakeview Road, Cleveland, Ohio.

Quotations furnished on other models. Quick service—guaranteed work. REFRIGERATION MAINTENANCE CORP., 365 East Illinois St., Chicago, Ill.

MAJESTIC UNIT Replacements—The only original direct factory Majestic replacements. Guaranteed 18 months in writing. All models \$30.00. Immediate delivery from our stock of 2,000 units. Also G. E. and Westinghouse rebuilding guaranteed 18 months from \$30.00 up. Largest rebuilders of Hermetics in the world. G & G GENUINE MAJESTIC REFRIGERATOR AND RADIO PARTS SERVICE, 5801 Dickens, Chicago.

PATENTS

HAVE YOUR patent work done by a specialist. I have had more than 25 years' experience in refrigeration engineering. Prompt searches and reports. Reasonable fees. H. R. VAN DEVENTER (ASRE), Patent Attorney, 342 Madison Avenue, New York City.

7 COMPLETELY STOCKED WAREHOUSES

REFRIGERATION AND AIR CONDITIONING PARTS...

BRANCHES: NEW YORK, CLEVELAND, ST. LOUIS and 3 CHICAGO BRANCHES

THE HARRY ALTER CO., 1728 SO. MICHIGAN AVE., CHICAGO, ILL.

MELCHIOR, ARMSTRONG, DESSAU CO.

300 FOURTH AVENUE

NEW YORK, N. Y.

Refrigeration • Heating Air Conditioning

PROMPT SHIPMENT FROM LARGE STOCKS
FOR THE RUSH SEASON

CHIEFTAIN

QUALITY-BUILT COMPRESSORS and CONDENSING UNITS

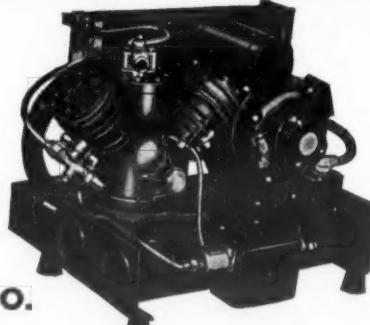
The CHIEFTAIN line represents precision manufacture and proven service, and is designed for all domestic and light commercial applications.

Sizes range $\frac{1}{4}$ to $\frac{1}{2}$ HP.

Write for prices.

TECUMSEH PRODUCTS CO.

TECUMSEH, MICH.



FRIGIDAIRE
"Model K"
CONDENSING UNITS
\$12.50

1000- $\frac{1}{3}$ and $\frac{1}{2}$ H.P.
COMPLETE LESS MOTOR
All removed from running installations—All operating CRATING or CASING \$2.50 additional

FEDERAL REFRIGERATOR CORPORATION ■ 57 EAST 25TH STREET NEW YORK, N. Y.

